THE IRON TRADE REVIEW

VOLUME XXIV. CLEVELAND, O., MAY 7, 1891. NUMBER 19.

THE IRON TRADE REVIEW.

A JOURNAL OF THE

IRON AND STEEL INDUSTRY, THE MACHINERY TRADE AND KINDRED INTERESTS

IS PUBLISHED EVERY THURSDAY BY THE

CLEVELAND PRINTING AND PUBLISHING CO.,

27, 29 *and* 31 *Vincent Street, Cleveland, Ohio.*

TERMS, (strictly in advance):

One year	$3 00
Six months	1 50
Three months	75

Advertising Rates Furnished on Application.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

CLEVELAND, O., MAY 7, 1891.

THE WEEK IN IRON CIRCLES.

General Features. The first of May has passed, and, in the midst of world-wide labor demonstrations, little has occurred to affect the general iron and steel industries of this country. In the field of consumption, reports are mixed. Pipe works are unusually dull, and consumption at a minimum. Car works have been running very light, but in some cases, at least, have now pretty well filled up with orders until Fall. Rolling mills are very slack, but picking up some. Stove and radiator foundries are running pretty full. Jobbing and machine foundries are complaining. All seem to expect more work later in the season. In money circles the situation grows easier. There is no difficulty in securing what is needed for legitimate purposes, and at low rates. The accumulation of funds at the centres had led to a little speculative spirit in iron as well as other commodities. A glance at the leading pig iron markets west of the Allegheny Mountains shows a continued state of dullness, with the exception of the Southern field, where there are extensive inquiries and numerous sales. At Louisville, there has been active buying during the week, with some fluctuation in prices, sales being made on basis of $10 and $10.25 for grey forge, Birmingham, though one transaction was made as low as $9.70; this arose from the seller not being aware of the changed conditions of the market, which has become decidedly active. A number of buyers, who usually purchase sixty days later, are now in the market for their season's supply, and the amount of iron inquired for is quite large. Prices, while much firmer, have made no special advance, and iron can be bought for delivery throughout the year on a basis of $10 to $10.25 for grey forge, Birmingham. Charcoal irons have also been in greater demand, and several lots that had been offered unsuccessfully during the last two or three weeks have been disposed of. Inquiries have been more marked than at any time since the beginning of the year. The market to a certain extent, however, is based upon crop prospects. The past week has shown a moderate amount of activity on the Chicago market in the way of local coke irons. These are being steadily pushed by companies manufacturing such metal and at prices so low, both for early and long scattered deliveries, that the amount of Southern coke foundry irons coming into this market is being reduced to a minimum; Northern furnaces, on account of their location, being able to make prices which are out of the question for companies located in the Alabama district. Southern coke brands remain in comparatively small demand. The week has shown considerable inquiry from large buyers for both charcoal and coke irons, demonstrating that leading consumers are disposed to anticipate their usual time of purchase on account of low figures now going. On Lake Superior charcoals there is less crowding of iron at the low figures which have of late prevailed, there has, however, been no real change in the charcoal situation. Besides further emphasizing the dullness which exists in the pig iron market, there is very little to remark as to the Detroit market, except that the street car strikes and the strikes of the car companies in that locality have been satisfactorily settled, and labor troubles, it would seem, would cause no further serious annoyance in the near future. The transactions in Lake Superior charcoal iron have been considerable in tonnage, but prices cannot be said to have more than fairly been maintained. At Cincinnati, reports have been current of some low-priced sales. Some of the large consumers in the West have been trying to engage their supplies of iron to the end of the year, or later, at current figures. In charcoal irons they have been successful, but in coke irons have not. Leading furnaces are taking orders for deliveries running through the Summer at full current prices. The month of April showed sales at St. Louis in some instances at even lower prices than the previous months, prices being cut to move some of the accumulation of stocks on hand, for prompt cash. There is no apparent increase in the demand at Buffalo, but consumption has reached about the lowest ebb attained before in a number of years. Foundries in the vicinity of Buffalo are still calling for pig iron at the rate anticipated by them several months ago.

The Local Situation. It is hardly much of material benefit to the ore trade to quote, as actual sales, the transactions reported some weeks ago as having "a string to them," or to speak of these transactions as new. The fact is that there has been practically no change in the conditions governing the ore market, the alleged information of eastern publications to the contrary notwithstanding. It must be remembered that there is now piled on Lake Erie docks rather more than two million, five hundred thousand tons of ore, besides the quantity stored in the furnace yards. A canvass of the ore docks shows that in no single instance a "new place" has been made, as the dockers call it, while the piles seem nowhere materially reduced. This, coupled with the dock strikes now in progress, will very naturally interfere with the early shipments of unsold ore. That the Lake Superior people understand the situation is evidenced by the fact that they are taking steps materially to reduce mining operations, several of the larger mines having already discharged a considerable portion of their working force. It is true that one mine announces the sale of its "entire output," but as the particular grade of this output restricts the transaction to less than fifty thousand tons—divided into at least fifteen parcels—it will be readily seen that there has been no opening of the ore season. Even if the furnaces should start up to run, they would not want to buy a pound of ore for the next ninety days, and it may be put down as a fact that as far as the immediate and direct market of the Lake Superior ore trade is concerned, no ore has been sold except as before mentioned, and under special conditions as to price. The coke question is also unsettled, although the output seems to be slightly increased. Still, it will require considerable more of an improvement to supply the Carnegie furnaces and the Illinois Steel Company, before the other consumers will be in position to commence operations, were they so inclined; and the price of pig iron in no manner warrants a resumption of activity. Sixteen dollars for the best grade of foundry iron will not pay for its production, with coke at $1.75, and rail freights at $1.20, which is said to be the rate shortly to be conceded by the railway companies. It must be borne in mind that the average reduction in the price of ore is fully a dollar and quarter as compared with last year's figures, and that the vessel rates will be very low this season, so that all the cut seems to be made in one direction, and none at all in the other. There is quite a demand by the steel mills for Bessemer pig, and $17 cash may be readily obtained for the spot article. On the other hand, all the Bessemer iron in the two valleys—good, bad and indifferent—has been cleaned up, and nothing remains to be sold. The furnacemen, at least the great majority of them, do not seem anxious to go to work until some settlement is made of the more important questions entering into the manufacture of pig iron, and since such a settlement is hardly a probable event until a betterment in the demand is manifested in the various lines of the trade, there is little probability of any early return of active operations. If anything were needed to add to the perplexities of the situation, it is the rumored strike, not only of the lake engineers and firemen, but of the sailors as well, so that the opening of the lake season, which was set for May 15, may be indefinitely postponed.

BONDING TOWNS FOR MANUFACTURES.

Following in the wake of the craze for bonding Ohio towns for natural gas purposes, has come the introduction of the iniquitous system of issuing bonds by municipalities for the purpose of aiding the establishment of new industries. At recent elections, quite a number of Ohio cities and towns decided by votes more or less overwhelming to take money out of the people's pockets and put it into the hands of individuals. That the system of bonusing by taxation is unwise, unjust and unwarranted by law, has been repeatedly shown in these columns, but the exact legal status of the case is not, we are sure, generally understood, and for an abstract of a recent decision of the Supreme Court clearly showing the illegality of the procedure we are indebted to the Cleveland *Press*. The reference follows:

In a similar case, to wit, that of "Loan Association *vs.* Topeka, 20 Wallace, p. 655," the Supreme Court declared: "To lay with one hand the power of the government on the property of the citizen, and with the other to bestow it on favored individuals to aid private enterprises and build up private fortunes, is none the less robbery because it is done under the forms of law and is called taxation. * * * This is not legislation, it is a decree under legislative forms. Nor is it taxation. * * * Beyond cavil, there can be no lawful tax which is not laid for public purposes."

We quite agree with the *Press* in holding to the opinion that the bonds, if issued, will not be worth, in law, the paper they are written on, provided that one takes the question of their validity to the highest tribunal in the land. So flagrant had become the evil in Canada that a general law was passed prohibiting such a power of taxation, and the question may well be raised whether a similar law is not needed in Ohio. The alarming increase in municipal indebtedness would alone seem to call for such action, aside from the clearly unjust and illegal aspects of the case, and we trust that some interested body of taxpayers will carry the question up to the end that it may be definitely settled in this State and the practice forever stopped.

TO A SHIP CANAL ADVOCATE.

An esteemed and intelligent correspondent of the Sharpsville (Pa) *Advertiser*, whom we readily recognize as an active promoter of the proposed Pittsburgh and Lake Erie Ship Canal, and a leading member of the Pennsylvania Canal Commission, quite mistakes the attitude of this paper toward the project in question if he thinks that it implies hostility to the enterprise *per se*. On the contrary *The Iron Trade Review* has published tenfold more about its progress than all of the daily papers of Cleveland combined. We have done this as a matter of news, and have expressed no opinion adverse to the enterprise except to remark that "stranger things have happened than the materialization of this scheme which now seems so visionary."

By "visionary" we do not mean that the lowering of freights by means of water competition is impossible, nor that a feasible route cannot be obtained for deep-water navigation between Lake Erie and the Ohio River, but the seeming visionary character of the project lies in its financiering. It is, in our judgment, too much to expect that either Federal or State government will embark in it, and just where the private capitalists can be found who are willing to put from $25,000,000 to $50,000,000 into the scheme, we have no idea. Pittsburgh iron men are proverbially enterprising, but we have never yet seen any proposition on their part to "father" the project. Our critic will, therefore, kindly excuse us if we are the least bit skeptical on the financial aspects of the case, while at the same time we continue to publish all the news concerning it.

LAWS AGAINST COMBINATIONS OF CAPITAL.

A well-known Ohio manufacturer writes *The Iron Trade Review* as follows:

It seems to me that the laws against combinations of capital, to prevent destructive competition and lower the cost of marketing products, are being carried to an extreme on one side; it would be all right if they gave the same "sauce to the gander." I am led to this remark from reading the ruling of Judge Pryor, of New York, as given on page 818 of the *Iron Age* of April 20. The capitalist tries to sell the products of labor so as to make profit by the same, but the law here "forbids any agreement or combination whereby that price is removed beyond the salutary influence of legitimate competition" * * * "it must be regulated by the supply and demand." If the results of labor are to be dealt with thus, why not labor itself?

Our correspondent opens up a large question upon which a great deal might be said; but as it has not been the custom of this paper to discuss labor questions to any extent, we forbear comment, though our columns are open at all times to a candid and temperate consideration of the problem stated, from whichever side the communications may come.

THE DEVELOPMENT OF A GREAT INDUSTRY.

Previous to, and since the passage of the McKinley bill, its opponents in their speeches and their papers, by every ingenious argument and specious plea, sought to create the feeling that many of its provisions were not of any account so far as being of practical good to this country, and, in particular, to the large number of workingmen engaged in its many industries. Indeed, so far from being protective in their results, such provisions of the bill were wild delusions of fancy; that the protective features of the bill were intended for the few to the injury of the many, and that time would prove them in many particulars to be a failure, etc.; that so far as they were intended to bring about any reciprocity in trade between United States and South American countries, that would not amount to much. In the contests to take place in many of the States in the coming months the opponents of this bill in every way in their power, in their speeches and papers, will continue to assail the merits of the same, under the impression that the mass of the working people are not of the thinking and reading class, and will continue to be blind to the fallacies of the arguments, which are being presented to them. In one particular has this opposition been very strong, and that as to the duty on tin, the argument taking this form: That it would be an injury instead of good in every way, and that the working people and others would have to pay more for their tin pails and cups, or any other tinware needed, on account of this duty.

In opposing this measure they claim that tinplate cannot be made in this country as cheaply as it can be imported, and that the amount of tin ore is limited in quantity and would soon be exhausted. This being the case, those going to the expense of putting up large plants to make tin, would in the end experience failure and a great loss of money. Instead of this being a fact, it is claimed that inexhaustible amounts of tin ore have been found; and the fact that much money is being invested in buildings and machinery for the making of tin, would seem to be sufficient evidence that those making the investment are not at all alarmed by any fear of the tin ore being exhausted in a few years; and as time passes by, the increase of this manufacture will furnish additional proof to the supporters and opponents of this measure, that it is not expected that these factories will be closed in a very few years and the venture prove a fatal loss to the investors.

The evidence is becoming apparent already that tinplate can be made in this country at a profit to manufacturers and at a less price than the imported article can be obtained. One good illustration of this fact is the case of Mr. J. M. Hayner, a prominent banker and agriculturist of Warren County, O., who has made a contract with Norton Brothers, of Maywood, Ills., for three hundred thousand two-pound tin cans, for canning his crop of sweet corn for this year. These cans are to be made from tinplate, made by American workmen in American factories. Last year, before there was any McKinley law, these cans cost him $2.25 a hundred. Mr. Hayner's contract with the Norton Brothers for these cans is $1.87 a hundred, a saving of 38 cents to him, which on this number of cans, amounts to $11,400. Aside from this saving, employment is given to a large number of American workingmen, furnishing support to their families and keeping in circulation in this country all of this money, instead of sending a large amount of it to England.

A new feature in this enterprise, never, we believe, known before in this country, will be the fact of Americans having their American food, served out of tin cans made in America from tinplate manufactured in America, and by American workmen, and all on account of an American tariff for the protection of American people. Thus do we have American skilled labor protected in this industry, and the American farmers protected in the increased quantity of sweet corn which will be raised and canned on account of this improved condition of affairs.

In a banquet given in Chattanooga some weeks ago, some of the dishes used on the table were made from American tin, the basis for this tin being thin sheets of steel made in Chattanooga by the basic process and coated with tin in the factory of Congressman Neideringhaus, of St. Louis. This tinware was of a very fine quality, having a very bright look, and a party who has seen some of it told the writer that this was so much the case that anyone seeing it and not looking at it very closely might have thought it made of silver. This is one instance of success thus far made in this industry in this country. Tests of tin which have been made in this country of American iron and tin ore prove it to be stronger and more tough than imported tin. This is shown in the fact that in bending it back and forth many times, it did not crack and break off as is claimed to be the case with some of the imported tin. Another fact

showing the success of this new industry in this country is that tin has already been made and sold of the same kind and quantity in boxes as the imported tin comes in, and at $5.00 per box less than imported tin can be sold for in this country.

To all true Americans who are deeply interested in every new industry which tends to furnish employment to large numbers of American people, and furnishing support to the hundreds and thousands in the families of such workmen, these facts will be interesting, as bearing upon the outcome of this and all other new industries.

J. P. G.

THE VALLEY FURNACES AND THE SHIP CANAL.

We find the following communication in the Sharpsville (Pa.) *Advertiser*, of April 29, signed "G.":

In its issue of April 16th, under caption: "The Two Valleys and the Proposed Ship Canal," *The Iron Trade Review*, of Cleveland, quotes from the *Advertiser*, of April 11th, certain calculations showing that with the Lake Erie and Ohio ship canal in existence freight charges on ore to Pittsburgh and Sharpsville, respectively, will be less than they now are to the extent of reducing the cost of producing a ton of metal by as much as $1 29 at Pittsburgh and 85 8-10 cents at Sharpsville.

After noting the fact that the present stoppage of iron making in the Mahoning and Shenango valleys—largely referable to maintenance by the railways of freight rates that are higher than "the traffic can bear"—opportunely affords argument in favor of the ship canal; and after having commended the calculations in question, to the attention of iron manufacturers, the *Review* remarks: "Whatever be said of the feasibility of the canal project (and that the Pennsylvania Legislature deems it feasible is evident from the fact that it has continued the canal commission in service), the argument of cheaper rates is a seductive one; and stranger things have happened than the materialization of this scheme which now seems so visionary."

We trust that the *Review* will not adjudge us hypercritical if we call attention to the fact that its use of the term "visionary" is inconsistent with its admission that the scheme in question involves nothing actually impracticable. Our esteemed fellow-worker for the public good intends, we believe, to convey the idea that he is not yet entirely convinced of the fact that the measure of constructing this canal is expedient.

That there are no "engineering difficulties" in the way of constructing a ship canal, to afford navigation for vessels drawing 14 feet of water, between Lake Erie and Pittsburgh harbor, the report of the Pennsylvania Ship Canal Commission sufficiently demonstrates.

There is no ground for question that the route recommended by the commission is positively better than any other available for the purposes in view. The length of that route, from Conneaut harbor to the Ohio river at Rochester, is something less than 103 miles; and is not more than ten miles greater than that of an air line between the two points named.

Considered with relation to the utility of the canal as a highway for commerce the cost of the work as indicated by the detailed estimate made by the commission, is so far within the prohibitory limit as to be practically insignificant.

The estimated cost of the entire canal (including three locks extra to the canal proper, for connecting the main canal with Ohio river pool No. 5 at Rochester), is, including allowance of $1,953 717 for contingencies, $26,375 188.

The output of pig iron in the Mahoning and Shenango valleys, in 1890, was 1,093,622 gross tons. With this output the saving in the item of freights on ore that the canal would effect, as shown in the calculations quoted as aforesaid by *The Iron Trade Review*, at 58 8-10 cents per ton of metal produced, would amount to $938,327.67.

The product of pig iron in Allegheny county in 1890 was 1,337,309 gross tons. With this output the saving of $1.29 per ton of metal, that the canal would effect, amounts to $1,725,128.61. So in a year of output like that of 1890, the canal would effect for the two valleys and Allegheny county, together, reductions from present cost of production amounting to $2,663,456; and this in the single item of transportation, and associated charges, on ore. Reductions on freights on coke to the two valleys, and on pig iron from the valleys and Allegheny county, respectively, would make a further important saving.

"But," somebody objects, "these figures are based on the proposition that the canal is to carry all the ore; which proposition is absurd."

There would be no absurdity in the proposition if the capacity of the canal to handle all the ore were the only requisite to its getting all of it. The railroads, however, will retain a large share of the traffic; but "lake and rail" rates will have to be equated with "lake and canal" rates wherefore the canal "effects" the savings, aforesaid, all the same. The canal will largely facilitate and expedite deliveries of ore at the furnaces; so that with aggregate deliveries, by canal and rail, very much larger than those of any former time, the "friction" of delivery will be materially less than at any time since the traffic assumed its present great proportions. This betterment of conditions at the furnaces will largely benefit the railways.

The canal, as it will supply the means for maintaining the current rate of growth of the iron-making industry of Eastern Ohio and Western Pennsylvania, will save to the railways a great traffic which, except the canal be built, they will lose; and will make for them a great traffic which, except the canal be built, they will never have.

The canal will make these valleys and the Pittsburgh and Monongahela Valley district the great industrial center of this continent. The railways will within a few years after the opening of the canal, be glad to let the canal carry all the ore and coal, while they handle the passengers, the food and household supplies, and the manufactured products of a closely congregated population of 2,000,000 people.

But the immediate motive for building the canal is not so much a desire to benefit the railways as to save and maintain the iron-making industry of the associated districts above named.

The $2,663,456 saved on ore freights, as aforesaid, represents six per cent. on $44,390,933.

We have good reasons for believing that the canal may be built for the sum named in the estimate of the commissioners; and that fully responsible parties are ready to undertake the entire work of construction for a round sum corresponding with the aggregate of items, for such work, specified in the estimate.

But even were the work to cost twice the extreme sum named in the estimate, or $52,750,476; the savings for the two valleys and Allegheny county, as above given, represent considerably more than five per cent. on that great sum.

According to conservative estimates the production of pig iron in the United States in the year 1900, will be fully double that of 1889, *provided always the cost of production* be duly restricted.

In these valleys and at Pittsburgh freights on furnace stock amount to about one-third the total cost of producing pig iron.

The relation of the cost of lake transportation to that of rail-transportation is fairly indicated by the fact that in the season of 1890 furnaces at Pittsburgh paid for railway dock-charges on ore at Lake Erie ports, and transportation of the ore an average distance of something less than 150 miles to Pittsburgh, nearly two cents per ton more than they paid for lake transportation of the ore, an average distance of 651 miles and discharge of the ore from the vessel at the Lake Erie port.

Vessels coming down the canal with ore will always get back freights of coal, fire-brick, building-stone, or manufactured goods; but were a steamer to take no back freight, she could deliver ore at Pittsburgh for 25 cents a ton less than ruling "lake and rail" rates and make more money in a season than she can in the lakes.

If we get the canal ready for the season of 1895, pig iron production in these valleys and the Pittsburgh district will in the year of 1900 be fully twice what it was in 1889; and the movement of ores from Lake Erie ports to the region in question will aggregate about 9 354,098 gross tons; of which (on the basis of operations in 1889) about 4,960,000 tons will go to Allegheny county and vicinity, and the balance to the two valleys.

The canal should be, and no doubt will be, a free waterway; and if it is free the transportation-charges on the above named tonnage for Allegheny county will be $3 934,768 less, and on the tonnage for the valleys $2,321 402 less, than they would be at the rates now ruling.

With a "toll" of 20 cents per ton on ore to Allegheny county, and of 10 cents per ton to the Mahoning and Shenango Valleys, the saving on the Allegheny county ore would be only $2,942,768, and on the valley ore only $1,881,993.

But delivery at the furnaces in the district in question by rail, in the period of one year, of 9,000,000 tons of ore, is a physical impossibility. If the canal be not promptly built, the production of ore in these valleys will decrease instead of increasing; and finally, in order to maintain even the materially decreased production, the railways will have to reduce rates fully as much as they will in event of the construction of the canal.

Meantime the area of greatest production of pig iron will have moved southward; and the great volume of general traffic which would come to the roads with the construction of the canal will have been lost to them.

The present stoppage of the furnaces in these valleys has already made inevitable a falling off in the product of this year, as compared with that of 1890, of at least 350,000 gross tons. This involves a falling off in railway traffic, of at least 1,500,000 tons; and of lake traffic, and sales of ore, of at least 568,750 tons.

As nobody knows when the furnaces will resume operations, nobody can say what the actual falling off will be. Let us hope that it may not be so great that we cannot make it good next year.

Meantime let us hold up the hands of the iron-masters. We commend this line of action to the *Iron Trade Review*. If that journal will devote an hour or two to a careful perusal of the Report of the Pennsylvania Ship-Canal Commission it will find ample ground for belief that the canal will work immense benefits not only to the iron trade, but to all the industries of the two great regions, interchange of traffic between which it will facilitate and foster.

The *Marine Review*, in its issue of April 23d, says, that the canal project "is the most unfeasible that might be imagined;" and that "it is the well arranged collection of statistics presented by the Canal Commission that is misleading." Pending explanation on the part of the *Marine Review* of the manner in which, and the extent to which the said statistics "mislead," we take the responsibility of assuring *The Iron Trade Review* that the statistics in question are authentic in every detail; and that the Canal Commission invites the closest test of the accuracy of them or any of them.

Clapp-Griffiths Steel in Naval Construction.

After a series of exhaustive tests the United States Naval Department has consented to authorize the use of steel made by the Clapp-Griffiths process for naval construction work. This steel is made by a special process which is not unlike the Bessemer converter method, but the product is reported to be of as good a quality as steel produced in the open-hearth. Molten iron drawn from cupolas is poured into a peculiar form of receiver provided with air passages. Hot air is then blown upward through the mass of iron, and the impurities are burned out. This process promises to cheapen steel that will be suitable for various purposes in connection with railroad rolling stock.—[National Car and Locomotive Builder.

AT the Washington navy yards the jacket has been successfully placed on the twelve-inch rifled gun for the coast defense vessel Monterey, recently launched in California.

STRANGE MANŒUVRES OF THE WELSH TINPLATE TRADE.

Tinplate trade manufacturers have decided to take a month's holiday in July, for it is definitely decided that nearly 400 mills will be idle during the whole of the month. A meeting of the trade was held at Swansea this week, when the proposal to close the works was formally adopted by a large majority of the trade. The makers who have declined to join the combination will not have a very busy time, for it is a foregone conclusion that there will be no American business in the market. The alleged reasons for the closing of the mills is to allow the accumulated stocks to be worked down. These stocks will presumably be in America, and just when it seems desirable to cultivate the trade in other countries it seems rather a bad policy to attempt to shut up all the works. The Scotch iron smelters for other reasons adopted this policy, and forced their customers to go elsewhere for supplies. Many of them, having made a change, will never renew their Scotch connections. Without any combination most of the tinplate mills must have been stopped in July, not to work off stocks, but to prevent their accumulation. The men employed in the mills are not overjoyed at the prospect of a month's idleness. A representative of the men, says: "The decision of the masters has come upon the men as a terrible surprise, inasmuch as the result of the masters' meeting shows plainly that the real cause is not the reduction of stocks, but the maintenance of the present high prices. The production of tinplates during the last seven months has been about 7,000,000 boxes, taking into account the various general holidays and stoppages. This means an average of 1,000,000 per month. The masters now say that the stocks have accumulated to about 1,000,000 boxes, but to get this the men must have been driving very unreasonably above the average of 36 boxes per shift allowed by the rules of the men's union, which is undoubtedly adhered to throughout the trade. To attain the present alleged stock during the course of the past seven months the men must have been working at the rate of 41 boxes, which every master must know is impossible to be turned out as an average throughout the whole trade; and even if all the plant at the existing works were of the most modern type it is very well known that one-eighth of these works could not really turn out an average of 400 boxes per week. The real object of this project is, according to the masters, the reduction of stocks; but the men must have been working 41 and 42 boxes per shift before they would be able to turn out 8,000,000, so as to leave a balance of plates in stock to the amount of 1,000,000 boxes." A workman's scheme for limiting the output is "that operations should cease every Saturday and Monday in all the works in the trade for two months after the end of June. If this were adopted it would mean a reduction of 500,000 boxes, which is half the amount of the present supposed stock. Knowing, as the masters do, that they require nearly the whole of the other 500,000 boxes for the sake of transit, etc, their object in reducing the stock, if it is a real one, could be obtained by that method, one which would not entail so much hardship on the workmen as a successive four weeks' stoppage would do." When the mills start up again in August it will be interesting to note the selling prices of plates. Cokes now quoted at 17s. 6d. are said to have been offered at 12s. 6d., delivered in August. The question of prices rests with the makers. If they can agree among themselves there is no reason why the prices current after the tariff should not be fully equal to those now ruling.—[London Iron and Steel Trades Review, April 25.

Lake and Rail Rates.

According to the *Wall Street News*, there is comparatively little danger or difficulty in the adjustment of the lake and rail rates. They will undoubtedly be placed upon a little lower level than last year, but they will probably be well sustained because all the lines will necessarily look forward to a large Fall traffic, and will prefer to keep peace rather than assist in organizing a contest that will leave rates in an unsettled condition when it ceases to be a matter of rates and becomes one of the facilities for handling business. It is going to be a question of supply and demand after the first of August. Light traffic and legislative interference have prevented the railroads from keeping up equipments and motive power. There is practical assurance, however, even though we consider nothing more than the current volume of traffic, that as soon as the movement of the crop begins, the railroads will be unable to handle all that is offered them. This, of itself, is likely to prevent a reduction of rates.—[Railway Review.

The English Iron Markets.

Concerning the English markets, our correspondents, S. W. Royse & Co, Manchester, writes under date of April 25:

"The dark cloud which hung over the pig iron markets during the second half of March has lifted to some extent during April. Prices on both the Glasgow and Middlesbro' markets have slowly but steadily advanced. Shipments from Glasgow, indeed, during this month are only very moderate, being much less than those during the corresponding period of last year; but the shipments from Middlesbro' show very well, and stocks there are decreasing, the production also being further reduced. At present, however, but little business is being done, a feeling being strongly held by many that the advance results from a speculative movement, consequently buyers are holding off, and already prices are a little easier."

Boring out Guns.

Nearly all the inner tubes for modern rifle guns are bored out from the solid. The great Krupp gun recently made for the Russian government, 44 feet long and weighing 135 tons, 16¼ in. bore was bored from the solid, with core bits, a tool like a crown saw or a diamond rock drill that cuts a thin groove around the core which is removed whole. In England a good many of these inner tubes are made of compressed steel, cast at the Whitworth works, but the main parts are bored. The first cut is a small hole of one and a-half in. to three in. diameter to guide the heavy tools, then a D bit follows, completing the bore to full size, less the finishing cuts. The writer brought from Sheffield some years ago, drill chips seven inches wide, from a 12-in. drill.—[Industry.

CANADA'S POLITICAL FUTURE.

Beyond question Great Britain has lost immensely through Free Trade, and not the least among her losses may be that of the prosperous, intelligent and liberal minded people at the north of us. That Canada will ever become an integral part of the United States we very much doubt. Indeed, we fail to see the desirability on either side for such a union. But we do sometimes look for a complete separation from the Mother Country, politically as well as commercially, and no surer way of bringing about this result can be had than that of building up on this continent a people whose prosperity comes from a policy totally at variance with that of Great Britain.—[Cleveland Iron Trade Review.

There are those in Canada and elsewhere who have hoped that the difference in the fiscal policies of the two countries would surely lead to a separation of Canada from Britain, and that that difference, and the similarity of policies of Canada and the United States would as surely lead to annexation. These hopers have been workers and prayers that such might be Canada's destiny; but whatever influences may have been drawing in that direction have been counteracted by the course of recent events, and that consummation is farther away than ever. In fact, it has entirely disappeared under a revulsion of feeling on the part of all true lovers of Canada. Anglo Saxons may be led by argument, but they cannot be dragooned nor forced; and those who have sought and are yet seeking to place Canada in a false and ridiculous light in the eyes of the world, hoping that thereby they can drive her to accept annexation as the only refuge from the ills they persistently insist besets her, make a vital mistake in estimating the character of Canadians. The crisis through which Canada is now passing is not drifting her away from her love for and allegiance to the Crown. Passing, as it were, through fire, she will emerge therefrom with stronger feelings of self-dependence and independence, but these will accentuate the love Canadians have for the Mother Country and their desire to maintain political connection with her. If Britain understands her own best interests she will do much to strengthen and encourage these feelings of affection. Canada is the brightest jewel in the British crown, and the integrity of the British Empire cannot be maintained unaided by Canada. If Britain appreciates the situation and governs herself accordingly, well and good. Perhaps, however, our contemporary is a prophet.—[Canadian Manufacturer.

Scarcity of Muck Iron.

The scarcity of muck iron has not been as great as it is at the present time in a number of years. It is almost impossible to get any more outside of Pittsburgh, which mostly supplies the market, and, in consequence the finished output in quite a number of the mills has to be curtailed, causing a great deal of lost time, and putting a large number of men out of work.

In the mill at Sharpsburg the puddlers can only turn out about 60 tons of muck iron from 28 furnaces in two turns. The finished amount should be 150 tons a day, whereas it is a little more than half that much. Spang, Chalfant & Co. are unable to make more than half enough of raw iron for the finishing departments of their mills, and until now these two firms have always been able to buy as much as they needed. The former buys more raw iron than any other firm in the city turning out the same amount annually.

Pittsburgh has at present four idle iron mills. These restrict the output daily about 500 tons, throw about 3 000 men out of work. But that does not include nearly half that many more who are idle in such mills that for want of raw material cannot be run more than half time. Since the mill at Kittanning has been shut down at least 100, or about half of the workmen, have come down to Pittsburgh, and the most of them are working in the different mills.—[Pittsburgh Dispatch.

Harriman, Tenn.

We are just in receipt of an elegant pamphlet of 48 pages, entitled "One Year of Harriman," which forms in itself a striking evidence of what American push and enterprise can do, when united with sobriety. Harriman is the new Prohibition city in Tennessee, started in February of last year, and this beautiful brochure tells what has been accomplished there in the short space of twelve months. Its descriptions appear to have been candidly written, and its numerous illustrations, as fine as the finest in our leading magazines, were reproduced from photographs taken on the spot. Gen. Clinton B. Fisk was at the head of the enterprise which inaugurated Harriman, until his death, last July, and with him, and still identified with the enterprise, stood such well-known Prohibitionists as Mr. Ferd. Schumacher, the Oatmeal King, of Akron, O.; Mr. James B. Hobbs, of Chicago; Messrs. Funk & Wagnalls, publishers of the *Voice*, Mr. Wm. Silverwood and Mr. A. A. Hopkins, of New York. Upon application to the latter gentleman, at the Clinton Hall Building, New York City, a copy of the pamphlet will be mailed free to any address.

THE miles of various nations, expressed in yards, are as follows: The Irish mile, 2,240 yards; Swiss, 9,153; Italian, 1,766; Scotch, 1,984; Tuscan, 1,808; German, 8,106; Arabian, 2 143; Turkish, 1,826; Flemish, 6,896; Vienna, 8 296; Roman, 1,628 or 2,025; Werst, 1,169 or 1,137; Dutch and Prussian, 6,480; Swedish and Danish, 7,351 5; English and American, 1.760.

SOME interesting figures, showing the cost of some of the guns used in the British land and sea service, are furnished by a recent Parliamentary return. From this it appears that nine 13½-inch guns have been issued to the navy at an average cost of $55,905. The 10-inch guns cost $28 480 each, and the 5-inch $2,840.

LAKE SUPERIOR MINING NOTES.

GOGEBIC RANGE.

Matters in the Upson district are quite at a standstill and will remain so until the iron situation changes for the better. It seems to us a very poor business for explorers to cease operations on account of a temporary lull in the general iron business. By such a course they are not prepared when booming times come, to take advantage of the situation, and hence are working on the wrong side of the market all the time.—[Iron Tribune.

There is but little to be reported concerning the work at most of the mines pending the opening of something that can be called an iron market, says the *Iron Ore*. When last season closed it was well known that its product would lap over somewhat onto this year, and the working force at most of the mines was reduced accordingly. Still there has been a fair amount of developing work done during the Winter, and everything is in readiness so that any amount of ore that may be called for can be promptly furnished. Under these circumstances there is no occasion for the special activity that is usually noticeable at this season of the year. Most of the mines on this range are now in strong hands, financially, and consequently have no occasion to offer their ore at sacrificing prices, but will wait for a satisfactory market, "if it takes all Summer."

MENOMINEE RANGE.

Geo. W. Baird, A. E. Guensburg and others interested in the property, will resume exploratory work at the Baird find, near Keyes Lake, early this month. This is the famous magnetic ore find, and is considered an unusually promising property.—[Florence Mining News.

The Monongahela exploratory work, west of the Shafer mine, has a depth of 85 feet, showing ore mixed with jasper and graphite. Depth adds to the percentage of ore and the shaft will be continued to 100 feet, when a crosscut will be started north, the distance to be carried depending on the showing.—[Florence Mining News.

At the Sheridan mine everything is looking good. The spur track is being graded and fixed up, and the timber is on the ground and being got ready for the new shaft house. A large force of men will be put to work soon, and everything looks as though the Sheridan would be an active shipper this season.—[Reporter.

This year's output of ore at the Ludington mine will be decreased from 10,000 to 15,000 tons owing to the fact that none of the product can be hoisted from A shaft. For the time only C shaft, B shaft and the old mine will be used in hoisting ore. While the new shaft house is being built at A shaft the miners can break up a large amount of ore and it will be ready to hoist when the new house is completed.—[Menominee Range.

MARQUETTE RANGE.

On Section 29, a depth of 600 feet from the surface, a diamond drill passed through 21 feet of handsome ore, an analysis of which shows 62 in metallic iron, and thirty-eight one-thousandths phosphorus. This is but a short distance from a hole put down some time ago, in which substantially the same ore was discovered. It is the intention to drill another hole further west in hopes a rise in the deposit may be established. There is no question but the company will open a valuable mine, at, or near this point, in the near future.—[Negaunee Herald.

The last diamond drill boring made by the Pittsburgh & Lake Superior Iron Co. encountered ore at a depth from surface of 628 feet, the angle of the hole being 40 degrees. Twenty-one feet of ore was cut, it being a bright specular, much resembling the product of the Republic mine. An assay of this gave 61.40 per cent. metallic iron, and .038 in phosphorus, showing it to be of good quality. Since cutting this ore the drill has penetrated a mixture of ore and jasper for 32 feet, and is still in that material, the management being desirous of proceeding further so that the true foot may be reached. This boring is 500 feet due south of the one preceding it, and which also cut a fine body of ore.—[Iron Ore, Ishpeming.

At the east end of the lake, the Lake Angeline Co. has cut 26 feet of ore and are now in jasper, which will probably cut out before the foot is reached. The ore has held the same fine quality as first announced, and all indications point to the probability of a good mine at this point.—[Iron Ore, Ishpeming.

The Republic has sold its ore for the present season, being the only property in the district that has made contracts of any importance. A few mines have made sales of small lots to keep some furnaces running until the business is finally settled. The condition is one of waiting.—[Iron Ore, Ishpeming.

Hours of Labor in the Different States.

The recent attempt to have a law passed making 58 hours a week the limit in the textile and other mills of Massachusetts makes the subject of interest in connection with legislation in other States. The hours of labor, as regulated by statutes in the different States, are as follows: In Maine, New Hampshire, Massachusetts, Michigan and Minnesota, for all minors under eighteen and women, 60 hours per week; Rhode Island, New Jersey and Connecticut, minors under 16 and women, 60 hours per week; Wisconsin, women and minors under 18, eight hours per day; Pennsylvania, minors only 60 hours per week; New York, women under 21 and all minors under 18, 60 hours per week; Ohio and California, minors under 18 only 60 hours per week; Indiana, in cotton and woolen factories, minors under 18 not more than ten hours per day; Georgia, all persons in cotton factories, eleven hours per day, or 60 hours per week; Maryland, all persons in cotton and woolen factories, not more than ten hours per day.

It will be seen that at the present time ten hours is the standard in all the States for women and minors, only two of the States making the law applicable to women over a certain age. In some of the States, women are allowed to work as many hours as they choose, the restrictions applying only to minors. Wisconsin is the only State having an eight-hour law for women and minors, while Georgia is the only one exceeding ten hours for the same, wher eleven hours is the limit per day.—[Manufacturer's Gazette.

GERMANY'S TRADE WITH AMERICA.

The "H. B. H." brings an article: "About the Commercial Political Situation," in which was followed up the subject of the Commercial Treaty with Austria-Hungary, it being said, among others, that, however gladly one might hail its final close, it would not be considered an equivalent for the possible loss of our American export. With regard to this, the before mentioned paper adds the following: According to German commercial statistics 613 6 million marks, or nearly 30 per cent. of the German export during 1889—amounting to 3,256 4 million marks—fell on America; the United States alone received of these 395 million marks. Presumably the German export to the American countries is by far more considerable still, because, when the exported goods are entered, the custom house very often is named instead of the transmarine county of destination, the European intercedent port via which the goods are sent. Still by far more considerable appears the part America takes, if one considers alone the export of German products of industry, because in the export to European countries are contained large quantities of raw material, partly not even of German origin. Exact calculations do not exist, but if one takes into consideration that just the export to America principally consists in industrial productions, one will not go far wrong when assuming that German industrial activity finds at present a market for about a third of its export in America. But as export and import are always closely connected in all commercial relations then, if the export of German products of industry would considerably decrease the import from America, consisting principally in raw material, would also suffer a great deal, and such a falling off of a highly developed commercial intercourse would weigh, first of all very heavily on German navigation, which has made the greatest progress in the traffic with America, and which shows now the most excellent results. Up to date the Imperial Government has shown the most careful attention to the maintenance and development of these commercial relations and the traffic, notwithstanding all prohibitive legislation. Proof for it are the numerous commercial treaties—with the clause for the nations "being favored most"—which have been made in the course of time between the German Empire and the American States. Such treaties are existing at the time being with the United States, with the Argentine Republic, Chili, Costa Rica, the Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Paraguay, Salvador. The oldest of these treaties may be cancelled now at any time and would be no longer valid after one year. The other treaties are valid until 1893, resp. 1894 (United States) 1896, 1898 and 1899. A differential custom treatment of German goods is therefore made impossible during the next years in most of these States. No treaties exist with eight other more important States in America, among them the Brazils. At any rate the commercial politics pursued so far direct the German government in the first line not to surrender at once to Pan-American tendencies, but to energetically endeavor to take steps for the maintenance and prolongation of the existing commercial treaties and to come with those States, with which we have no commercial treaty yet, to a commercial political agreement on the basis of "being favored most."—[Kuhlow's German Trade Review.

Tin Manufacturers' Meeting.

A meeting of iron manufacturers was held in the Fifth Avenue Hotel, New York, on the 29th ult., to effect a temporary organization of those actively interested in the promotion of tinplate manufacture in the United States. The gathering was the outcome of an informal meeting of Pittsburgh manufacturers, held some time ago in New York City. There were present: B. M. Sommers, of Sommers Bros. & Co; W. C. Cronemeyer and Mr. Williams of the United States Iron & Tinplate Co., Pittsburgh; Alfred Marshall, of Marshall, Bros. & Co., Brooklyn; P. H. Laufman, of the P. H Laufman Co, Apollo, Pa.; C. R. and J. W. Britton, of the Britton Rolling Mill Co., of Cleveland, and T. M. Brown, of the St. Louis Stamping Co. Others represented by proxy were: Jennings Bros. & Co., of Pittsburgh; Canonsburg Iron & Steel Co, of Pittsburgh; Kirkpatrick & Co., of Pittsburgh, and the Falcon Iron & Nail Co., of Niles, O. B. M. Sommers acted as chairman, and the following were elected a committee on permanent organization: A. Marshall, F. G. Niedringhaus, B. M. Sommers, W. C. Cronemeyer, and J. W. and C. R. Britton, chairman and secretary, respectively.

In the course of the meeting it developed, according to press advices, that all the mills whose representatives were present, were in working order, and together were turning out plates at the rate of about 60,000 annually. It was further stated that there are a number of mills already adapted to rolling sheets for tinplates, and it was thought a comparatively small outlay would put many others in shape for this character of work. If it becomes possible to leave the rolling of sheets to the mills which are now equipped for the work, and have the tinning plants proper in the hands of others, it was believed the industry would be thoroughly established with less expense.

Letters from mining companies in the Black Hills, S. D., and San Jacinto, Cal., said that the mines would be able to supply tin abundantly in July, after which the meeting was adjourned. The next will be held in Pittsburgh, on May 20. The manufacturers attended the Tariff League dinner in Madison Square Garden.

THE Jeffrey Manufacturing Co., Columbus, O, have established a Western branch at 48 South Canal street, Chicago. Mr. J. H. Gregg, a practical and thorough engineer, of many years' experience, will have charge of this agency. The Jeffrey Manufacturing Co. make a specialty of chain elevating and conveying machinery, and anyone desiring anything in this line should write for catalogues and further information.

WHERE THE HEAVIEST FORGINGS ARE MADE.

It would hardly be expected that the establishment making the heaviest forgings made in the country would be found in a place as far removed from tide water as is Cleveland, but many of the heaviest shafts used in steamers navigating salt water were made here by the Cleveland City Forge & Iron Co., there being no other place where they could be made.

Nasmyth, when he invented the steam hammer, thought he had sounded the death knell of helve hammers, and on the leaf of his sketch book, containing his first drawing of the steam hammer, is a sketch showing the helve trip-hammer in the form of a man with his head on the block, Nasmyth himself being represented as an executioner, who, with uplifted axe, was in the act of beheading him. Nevertheless, small trip-hammers are used to-day by the thousands, and that large helve hammers are still used to good purpose can be seen at this establishment, where they have twelve of them that are monsters. One just being put in at the time of my visit is supposed to be the largest helve hammer ever built, its total weight being about 60 tons. The helve, which is of wood, is 32 feet long, and the total weight of the striking parts is about six tons. The die block weighs between 25 and 30 tons. The hammer is worked by a steam cylinder, which is vertical, and placed forward of the trunnions. It is 48″ diameter. The man who makes the forgings on such a hammer seldom really touches anything about it or the work. A number of other men handle the work, directed by the motions of his hands, and a boy stands at the valve which admits steam to the cylinder, and, directed in the same way, regulates the stroke. The new hammer was built by the Cleveland Shipbuilding Co. Some of the other hammers approach this one in size but none are quite so large.

There are a number of upright steam hammers, the largest of these being built by Frederick B. Miles, now of Bement, Miles & Co. It's total weight is about 200 tons; its foundation is 51 feet deep. The distance between the legs is something over 16 feet; the stroke eight feet, and the weight of the falling parts over 10 tons. It is served by two steam jib cranes each capable of handling 80 tons, and a switch from the railroad runs into the building within reach of the cranes. The smaller hammers are ranged along between this one and the machine shop, a track being placed in front of them by which forgings can be delivered to any of the heavier tools.

These consist of lathes, planers and slotters that are capable of handling such work as comes from the hammer, among them being a slotter built by Hewes & Phillips, of Newark, illustrated in our issue of April 5, 1884. This tool, when I saw it, was shaping up a forging, which was to be used about the steering gear of one of the new cruisers, and was taking off a chip 2½ inches wide, and about ⅛ inch thick. Mr. Wm. Schneider, the man in charge of it, said it had taken them up to 3½ inches in width. He said that English mechanics who had been to the works, and seen it, said they had seen larger and heavier slotters in England, but none that would take such heavy cuts.

The largest forgings yet turned out at these works were the rolls for the Mare Island Navy Yard. They finished to 32 inches diameter, and were 35 feet long over all; their forged weight being something over 40 tons each. A number of three-throw interchangeable, collared crank-shafts have been made, each of which weighed about 32 tons.

The shafts of the Fall River steamer "Puritan" were made here, each of them weighing about 40 tons. The beam strap for the same vessel weighed 20 tons, and the connecting rods 21 tons. Other heavy forgings have been made for various Sound boats, and for several of the Brazilian line boats.—[American Machinist.

SOME IDEAS ON MACHINERY ADVERTISING.

Superior mechanisms and systematic and persevering methods of advertising are the essential elements for the attainment of the greatest success in the machinery business.

I have in my mind one concern which grew from a very small beginning to its present greatness in a few years through the application of these adjuncts. Not one of its customers has ever seen a representative or drummer offering its productions, for they are sold only through the influence of the newspapers and trade journals. This is the age for the "something new," and the master spirit guiding the mechanical department is alert to find out the wants of the possible customer. The merits of new machines also need to be presented through effective and thorough advertising. My argument is, that both the mechanic and the advertising man must display more than ordinary experience and intelligence to bring forth the best results.

In days past it was thought important to dress the machine with colors and stripes to please the eye. Now the machine that does the best work is the one that sells the best, and rare is one seen with other than an ordinary coat of steel colored paint. This change was wrought entirely through the effectiveness of advertising. It was thought that the additional expense of fancy painting could be done away with, the labor and expense saved, and the money invested in advertising. In time the public became convinced that paint was not so desirable a feature, after all; what was wanted was machinery to do its work in a manner to secure the highest efficacy.

All readers of newspapers do not buy wood or iron working machines. Some do; not many. Sellers of most goods have buyers of some kind at all times. Their eyes can be caught by an advertisement worded with special attractiveness; but the man who wants a machine for a certain purpose must have it brought to his notice in the shape of a handsomely engraved cut displaying its valuable points. The better the cut, the quicker the perception of its usefulness is reached. The machine must have value or the advertisement is lost.

There are many machinery buyers who have some slight knowledge of machinery, but who have made their money in other business than the one they expect to engage in. With them, too, comes the value of a superior engraving. They are impressed with the quality of the work and the skill required in its execution; thus the first attack is won.

The next is a description stripped of all unnecessary verbiage, written so plainly that a child of passing understanding can almost realize the machine in actual operation. It must be shown in its best light and position, with the parts numbered or separately shown; this appeals to that sense of desire to study out from the description what lack of comprehension they may have of it. Then comes the correspondence to sell it. That is strictly office work and not in the advertising line. To bring the customer to the office or to have him mail his letter for further information is where the advertising man stops. Of course, it is understood a conspicuously displayed advertisement cannot by any means be overlooked. It just as much required as a printed letter-head.

Reading notices which are adroitly written and compactly worded assist towards securing correspondence. By all means bring the "something new" forward at every opportunity and hit the nail hard, not once, but often, to drive it home. While admitting that all men have not the special aptitude for getting the best returns through the medium of newspaper circulation, there can still be a decided improvement shown by the machinery builders in their advertising. We all agree that the advertising man is the mainstay of a growing business, and his connection with it becomes so close that he is not to be classed with the ordinary clerk.—[James T. Brown, in Printer's Ink.

BRITISH IRON AND STEEL DEPRESSION.

The end of the first quarter of the year finds the iron and steel trade of the country in a very depressed and unsatisfactory condition. This depression, however, has only manifested itself decidedly during the past few weeks, and appears somewhat exceptional in its character. During January and February trade was quiet, but the fluctuations in prices were very small. Scotch pig iron warrants ranged between 40s. 11d. and 46s. 4d. Cleveland did not fall more than 1s. per ton, but hematites receded about 4s. per ton. During March there was a very smart fall, Scotch warrants touching 42s.; Cleveland, 38s. 6d; and hematite, 47s. 6d; and all these prices are lower than the minimum figures of 1890 and only a few shillings above the lowest prices of the last 30 years. In 1888, Scotch warrants touched 37s. 1d; Cleveland, 31s.; and hematite 40s. 7d.

The fall in prices during the last few weeks may be traced to two or three causes. The first was the blowing in of the Scotch furnaces, with a reduction in wages to the furnacemen of 20 per cent., this giving the assurance of cheapened cost; the second cause was the slackening of both foreign and home demand; and the third the unsatisfactory character of the outlook. These causes combined led to heavy selling, not only by holders, but also by bears, and a fall of about 4s. per ton took place in the short space of a month. This fall has brought prices all round below cost of production, and unless there is some considerable relief in prices of coal and coke (which means a reduction in wages), the loss will be very considerable, and we may expect to hear of a further blowing out of furnaces. The low prices already reached have caused the Middlesborough smelters to give notice both to their miners and furnacemen of a reduction in wages of 12½ per cent.

The coal trade has so far maintained a strong and healthy position, but there are already signs, we think, of a coming change. With the great shrinkage in the volume of the iron and steel trade the consumption of coal must be decreased, and the laying up of so many steamers must tell in another direction. Some reduction in prices of coal and coke may therefore be looked for, but there will be a point at which the coal proprietors will have to insist upon a reduction in collier's wages; and judging from the late action of their leaders, it is to be feared this may cause difficulty and some delay, which will retard the fall in prices. Since 1881, there has been an advance of 50 to 60 per cent. in collier's wages, and it will take a long and severe struggle to bring wages down to their former low level, if it is possible at all to get back to so low a standard The labor question is a very important factor in coal and iron, and the future range of prices may be considerably influenced thereby. Until, therefore, there is some very decided reduction in the cost of coal and coke we cannot see how reduction can go on at present prices.—[London Economist.

Pennsylvania's Supremacy.

Different sections of the country come forward frequently as claimants for a high position in the iron trade. It is usual, then, to build high hopes on the decadence of the Pennsylvania iron trade, which is soon to follow the ascendency of blossoming and youthful rivals. We have the curiosity to examine more closely the status of Pennsylvania and present as the result the following table, which places side by side the total make of the country and that of Pennsylvania from Mr. Swank's last report:

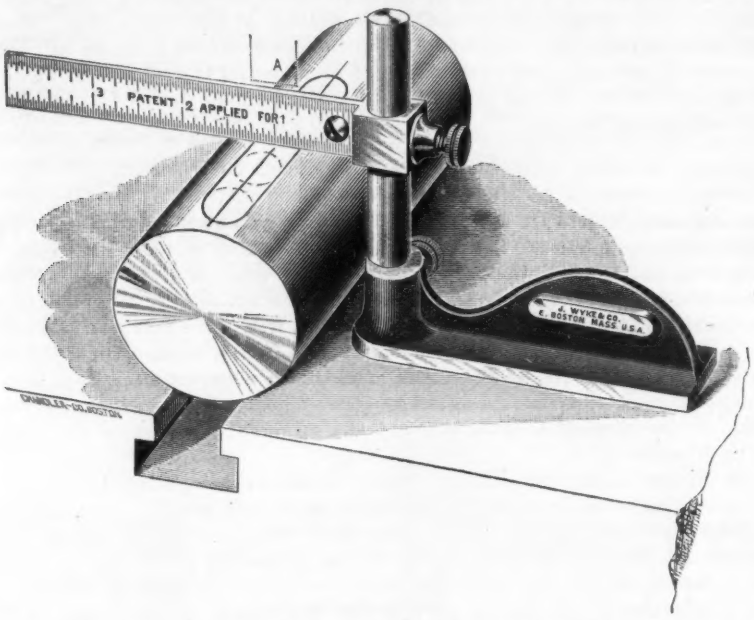
PRODUCTION OF IRON IN PENNSYLVANIA.

	Total United States. Net tons.	Pennsylvania. Net tons.	Per cent.
Pig iron	10,307,628	4,945,169	47
Bessemer steel	4,131,535	2,523,424	61
Open-hearth steel	574,820	467,614	81
Crucible steel	79,716	60,490	77
Steel rails	2,013,188	1,396,460	69
Steel cut nails	191,740	39,532	20
Iron cut nails	90,307	51,759	57
Wire nails	156,795	53,082	33
Steel plates and sheets	401,537	288,131	71
Iron plates and sheets	505,642	376,514	74
Other rolled steel	1,829,247	1,001,582	55
All rolled iron	2,820,377	1,479,318	52

To use the most significant fact shown by this table is not the eminence of Pennsylvania in the manufacture of the cruder articles, but its high position in the production of finished goods.—[Iron Age.

WYKE'S KEYSEAT OR SPLINING GUAGE.

The cut herewith given represents a new tool for setting shafting on the planing, shaping, milling or drilling machine, when about to have slots, splines, or keyseats cut into them, also for setting the tools, whether for planing or milling out the slots. The cut shows the operation of the tool so clearly that little explanation is necessary. It enables the artisan to work rapidly, correctly and mechanically, and is so simple that anyone can understand it. Manufactured by J. Wyke & Co., East Boston, Mass.



THE STAN-ALUMIN METAL CO.'S "ALUMINOUS" METAL.

A new metal roofing material is herewith illustrated. The metal is called by its manufacturers "aluminous metal" on account of its being a composition "chemically of homo-aluminous properties." The metal is admirably adapted for all the uses to which tinplate can be adapted, indeed, the assertion is made with emphasis by the manufacturers that it is superior to tin, iron and steel for general use in building, as it will better withstand exposure to the elements. Experiments have proved that this aluminous metal is positively an anti-rust material; it will not corrode, and what is still more in its favor, unlike tinplate, it is not at all necessary to protect it even by a coat of paint. Its ductility, lightness and durability, coupled with the qualities already referred to, make it an invaluable addition to the resources of the tinsmith, roofer and cornice maker.

We have received from the Stan Alumin Metal Co., of Canton, O, an illustrated catalogue, showing the many purposes for which this metal can be made available, but before referring to the different manufacturers herein displayed, we may be excused for quoting an extract from the work in which the manufacturers themselves set forth the claims of this metal in an address "To Architects, Builders and Tinsmiths:" "Its ductile and flexible qualities admits it to the use of all forms and kinds of roofing, gutters, valleys, conductor pipes, linings, etc., and it can be worked the same as copper. It is not our desire to discuss the faults of different kinds of roofing material, any further than to say wherein aluminous metal is superior. While we are recommending its use on the best buildings, and bringing it into direct competition with copper and the best tinplate, we have no fear or hesitancy to recommend it in many respects superior to copper, at a price not exceeding that of good quality tinplate. From authentic knowledge we state that copper is not recommended as the best article to use for gutters, valleys, etc., for the reason that there is very little provision, if any, in the nature of the metal itself, to resist contraction and expansion, and which can only be overcome by special and necessary construction. Heretofore when copper was used for roofing, it was necessary to use copper for gutters and valleys, as water flowing from copper would corrode the best tin, if tin was used. Note here the point in favor of aluminous metal, which has none of the corrosive properties.

"Actual tests prove that aluminous metal contains no corrosive properties, verdigris, or anything injurious to water. Besides its ductile and flexible qualities, it possesses great tensile strength, and on account of having the foregoing properties can recommend it superior to copper or tin-plate. We have ample reason to believe it to be the most durable and lasting material known, and destined to supersede copper and tinplate for building purposes."

These are strong claims it must be admitted. The company who make them, however, are thoroughly responsible for their statements and our own examination of samples prompts us to say that we believe it is destined to come into universal use for all the purposes for which sheet metal is now utilized, and this within a brief space of time. Very high testimony has been obtained from analytical experts certifying to the merits of the metal. As a roofing material, it is furnished in rolls containing 100 square feet for double seaming.

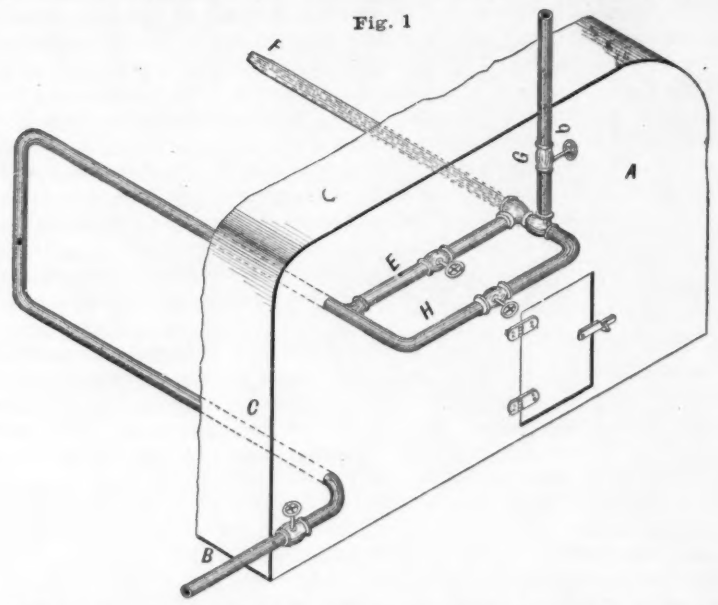
Among the many uses to which it may be put we find in the catalogue illustrations of, together with price quotations for, aluminous metal shingles, eave-troughs, eave-trough corners, gutters, expanding conductors, ridgings, crestings and finials, cornice, window and door caps, etc.

In addition to the foregoing, the company are also prepared to furnish to the trade pure aluminum and aluminum alloys of the highest quality.

JENNING'S INJECTOR FUEL OIL BURNER.

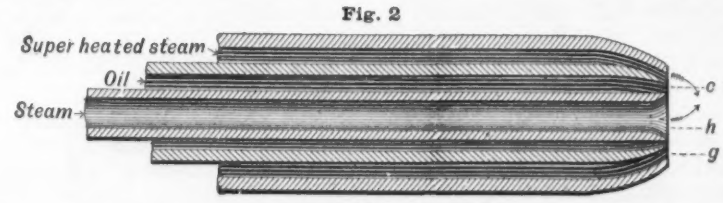
This invention is important on account of its powerful efficacy and extreme simplicity. The illustration shows a perspective view of the front portion of a furnace, sufficient to indicate the disposition of the pipes in relation to the furnace, and to locate the burner nozzle. Fig. 2 shows a sectional view of the nozzle, the arrangement of which is a highly important factor in the success of the invention. A steam pipe B is arranged to enter the front and extend back into the furnace, return forward and out, thence laterally by two branches (E and H) to an inward direction, terminating with the compound concentric nozzle, shown in detail. A vertical oil supply G joins the inwardly

Fig. 1



extending pipe. At the final joint connections, the concentric order of the nozzle pipes is arranged, the oil pipe being contrived as a somewhat reduced tube with slightly constricted end; the steam is diverted or divided into an external pipe and a small internal pipe placed within the oil pipe. The steam pipe in passing through the furnace, allows the steam to be heated, and dry, and when blown out at the nozzle, causes a thorough spraying of the oil and a fierce, hot, clear flame. The steam in the two terminal divisions is regulated by separate valves, as is also the oil supply. The contraction of the outer nozzle pipe causes the steam jet to deflect inwardly and cross, forming a conical flame. The inventor is largely engaged in the construction of these burners and their perfection is guaranteed. Ten pounds boiler pressure of steam is all that is necessary to operate the nozzle. This invention renders available, to the highest degree of advantage, the use of crude petroleum, which is very much cheaper than coal, and its use through the apparatus here considered, completely settles the universal coal smoke nuisance. The apparatus is easily adapted to any furnace with no material alteration. It is especially adapted for generating steam under all descriptions of boilers, chemical works, breweries, malt kilns, oil refineries, salt works, lime kilns, potteries, evaporators and dryers of all descriptions, sugar refineries, heating buildings, hot air or steam, and for all purposes where extreme or mild heat is required. The inventor is Mr. W. M. Jennings, of Buffalo, N. Y.

Fig. 2



A FLY WHEEL, weighing over 20 tons, 20 feet in diameter and with a 42-inch face, was cast at the Star foundry, in Worcester, Mass., recently.

THE ELECTRICAL REDUCTION OF ALUMINUM.

So much has been heard, recently, of cheap aluminum that a description of the methods of obtaining it is just now particularly appropriate. Mr. Brown's paper, read before the American Institute of Electrical Engineers, is therefore, especially welcome. It is devoted more particularly to a description of a single process, the Heroult, now in operation at Boonton, N. J. This method of obtaining aluminum is, like the other modern processes, strictly electrical. Mr. Brown's paper gives a clear idea of the procedure for the production of aluminum bronze, but is, unfortunately, silent as to the details of the reduction of pure aluminum from its ores. There are at present three successful electrical processes for the production of aluminum and aluminum bronze; possessing certain features in common. Of these the Cowles is perhaps the earliest, and is peculiar in employing the intense heat of the electric arc for smelting pure and simple. Roughly speaking, the method consists in forming an enormously powerful electric arc in the interior of an infusible crucible, making a genuine electric furnace, in the fierce heat of which aluminum oxide in its native form of corundum can be reduced in the presence of carbon. If no metal is present in the furnace to combine with the freed aluminum, the success of the operation is interfered with by the formation of carbide of aluminum. The process, therefore, has up to the present shown itself best fitted for the production of alloys. For this purpose, with the alumina and carbon in the furnace is mixed granulated copper that combines with the aluminum as fast as the latter is set free. The result is a bronze rich in alumina, containing as high as 40 per cent. of that remarkable metal. This bronze can then be employed in the formation of similar alloys with varying percentages of aluminum.

The Heroult process, as described by Mr. Brown, consists in passing a tremendously powerful current between a hard carbon anode and a cathode formed of a carbon-lined crucible containing molten copper and alumina. At the start bits of copper ore are thrown into the crucible and melted by the current until a considerable quantity of the molten metal is in the bottom of the crucible; then pure alumina is added; this floats upon the top of the copper, and the anode is then raised so as to leave a small space in which a process of reduction partly electrolytic and, probably, partly by smelting, can take place. The alumina is introduced in small quantities at frequent intervals and the reduced metal combines with the copper. The process is continuous, as the crucible can be tapped at any time and a portion of the alloy removed. Such is the Heroult process for manufacturing bronze. From figures obtained from Heroult reduction works abroad, the production of aluminum is too great to be accounted for wholly by electrolytic action, so that in all probability smelting and electrolysis go on together. Mr. Brown does not give the details of the operation for producing pure aluminum, but from the description of it contained in the English plant it appears to be electrolysis of a fused mixture of cryolite, the double fluoride of aluminum and sodium, with pure alumina. The cryolite is probably the substance decomposed in this case, the oxide serving to take up the fluorine set free and keep up the supply of fluoride.

The third process, employed by the Pittsburgh Reduction Co., working under patents granted to Mr. C. M. Hall, is more purely electrolytic in its character, but closely resembles that just mentioned. A carbon lined crucible, containing molten fluorides of calcium, sodium and aluminum, these latter being obtained by melting together cryolite, aluminum fluoride and fluorspar, is subjected to the action of a powerful electric current from a carbon anode. Pure aluminum is reduced freely from this mixture, and alumina is added for the purpose of at once keeping up the supply of ore and taking up the nascent fluorine that is produced. The exact reactions are not altogether well known, but are substantially as mentioned. The whole process is a continuous one, the aluminum being removed from the bottom of the crucible by ladles whenever necessary.

Both the Heroult and the Hall processes are readily applicable to the production of pure aluminum, but it should be remembered that this can only be produced by using pure materials at the start. The very best results are only obtained by using artificially purified materials instead of relying on the natural ones. As aluminum is peculiar sensitive to small impurities the utmost care in this particular is necessary; even the crucible may contain enough silicon to interfere with the production of pure metal. In spite of the fact that, from its low atomic weight, the electrolysis of aluminum is anything but an economical process, electrical power can now be obtained so cheaply that such a method becomes not unlike other known means for producing aluminum. A point has now been reached when that metal can be obtained at a price sufficiently low to permit its extensive use if desirable. The problem now before the metallurgist is to discover alloys of aluminum that are possessed of good mechanical properties, and, at the same time, retain the invaluable property of lightness that is the chief characteristic of that beautiful metal.—[Electrical World.

Big Marine Engines

Through the kindness of Mr. William Smith, Superintendent of Motive Power of the Chicago & Northwestern Railway, who was for some years an engineer in the Cunard Steamship Co.'s employ, we have received figures of the weight of the different parts of the engines of the steamers "Umbria" and "Etruria," and other particulars about the immense engines which force the great vessels across the Atlantic at a speed of about 24 miles an hour, with a developed horse-power of 15,000. The total weight of the engines is 2,080 tons. The engines are the triple expansion type, the high-pressure cylinder being 71 inches diameter, and the two low-pressure cylinders each 105 inches diameter. The low-pressure cylinders each weigh 35 tons, and the high-pressure cylinder 22½ tons. The head of the low-pressure cylinder weighs over ten tons, or more than two sets of cylinders for ordinary locomotives. The low-pressure piston weighs over six tons, and its ring alone weighs two and a-half tons. The crank shaft weighs 30 tons, and one connecting rod weighs over twelve tons. The steel tunnel shaft weighs over 20 tons, and the propeller shaft 25 tons. One boiler empty weighs 71 tons, and it holds 51 tons weight water, and there are nine boilers used, containing 72 furnaces. The smoke stack is 16 feet nine inches in diameter and weighs 36 tons. There are on board the vessels about 120 men in the engineering department. The work of caring for the engines is performed in six watches of four hours each. Every man takes two watches a day, having four hours on and eight hours off duty. There are three engineers, three oilers, 18 firemen and 12 coal passers on duty during each watch. About 300 tons of coal is consumed daily.—[National Car and Locomotive Builder.

OCEAN VESSELS BUILT IN LAKE SHIPYARDS.

Lake shipbuilders are now engaged on six steel steam vessels that will go down the Welland and St. Lawrence canals to the Atlantic before the close of navigation, and this number may be doubled if a profit is found in the Pacific coast trade for two of these vessels, barges of the whale-shaped type built by the American Steel Barge Co., of West Superior, Wis. The four boats, in addition to the two barges are two government light-house tenders, for which the Globe Iron Works Co., of Cleveland, received a contract a few days ago, a small twin-screw steamer to be built by F. W. Wheeler & Co., of West Bay City, Mich., for the Nicaragua Canal Co., and the steamship Keweenaw, also building by Wheeler & Co.

In the case of only one of these boats, the Keeweenaw, will it be necessary to resort to unusual measures in getting them to salt water. The others are Welland Canal size, and are shallow enough to run the rapids of the St. Lawrence river. The builders of the Keweenaw propose to launch her, probably next Saturday, in two sections. The launch will undoubtedly attract a great deal of attention. The cost of getting the Mackinaw, a sister ship of the Keweenaw, to the Atlantic last Fall, was nearly $10,000, one-half of which amount the builders expect to save by the new plan. The cutting in two of the Mackinaw was the first of the sort ever attempted by an American shipbuilder. The Mackinaw was run under her own steam from West Bay City to Buffalo, where she was placed in the Union dry dock, a row of rivets cut out around her amidships, following along the seams and butts, with the necessary irregularity consequent upon a proper breaking of butts as called for by the classification rules. A strong amidships bulkhead forward of the fire-room rendered the after section tight, and while the vessel was building a temporary steel partial bulkhead had been fitted in the after part of the forward section, clear of all broken butts. To make the forward body tight, it was caulked and stiffened with shores about this temporary bulkhead. This work completed, the two portions of the boat were towed down Lake Erie, through the Welland Canal, down Lake Ontario and the St. Lawrence river to Montreal, where a small dry dock was found, in which, by building an additional cofferdam around the boat, the portions could be assembled together. Here the work was done, and the vessel to all appearances having been constructed as a whole, proceeded to New York. She was very successful in the coasting trade, and is now on her way to Yucatan for a load of hemp.

The Keweenaw will be cut apart as she stands on the stocks, the work being done in the same manner as was done to the Mackinaw at Buffalo, the forward end pulled ahead a few feet, and then each portion launched separately. The two parts will be towed from West Bay City to Montreal, where the work of putting them together will be done the same as before.—[Marine Review.

The Right to Repair Patented Articles.

We have heard the question repeatedly raised by railroad men of late: Can we have patterns made to renew the parts of broken car-couplers without obtaining permission from the patentee? This matter has been definitely settled in the courts in relation to other patented devices. The rule laid down by the United States court is, "Where a patent covers as an entirety a machine composed of several separate and distinct parts, the purchaser of such a machine from the patentee will not infringe by replacing such parts as wear out, as often as is necessary, so long as the identity of the machine is retained. But if the patent is for a separate and distinct element of the combination, a purchaser will infringe by replacing such element."

This means that if the knuckle, for instance, should be the only patented part of a coupler, or, if it should be covered by a separate patent, it would be illegal for a railroad company, or an agent acting for them, to make new knuckles; but if the knuckle is merely a part of the patented coupler, new ones may be made for repairs without infringement of the patentee's rights. In cases where the railroad companies can legally make pieces to repair a patented article they are at liberty to employ other manufacturers to do the work, or any one in its employ, is under no obligation to use the same kind of materials in repairing as were used in the original manufacture, and these may be replaced by better materials.—[National Car and Locomotive Builder.

A Decision of Interest to Manufacturers.

A recent decision, by the Supreme Court of the United States, February 2nd, 1891, includes, among other clauses, the following:

"A grant, by the owner of a patent, of the sole and exclusive right and license to manufacture and sell a patented article throughout the United States does not include the right to use such patented article, at least if manufactured by third persons, and is therefore a mere license."

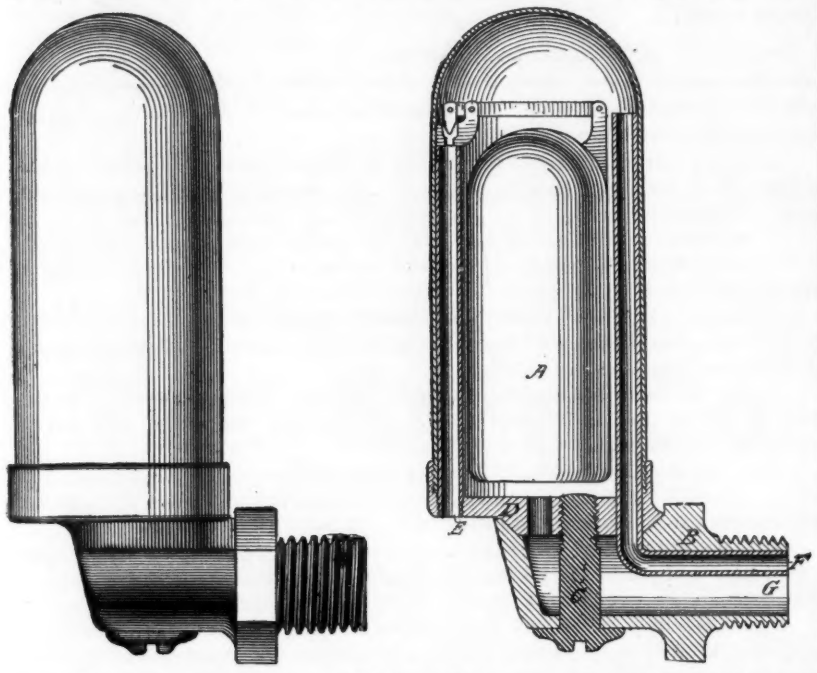
The same decision includes that in the case of an assignment for "manufacture" and "sale," the assignee may bring suit for infringement, but does not invest in him the title of the patent, and that in a suit brought for infringement by "use," the original patentee must be joined. The inference is that an assignment of any kind conveys full title only when it is for "manufacture, sale and use." This is a very important matter, and one that should be kept in mind in drawing either full or partial assignments.—[Industry.

VAN AUKEN'S HOT WATER AUTOMATIC AIR VALVE.

Rapid advancement in the past few years has been made in automatic devices for the control of steam as a heating medium; but very little has been done for the regulation of hot water heating by automatic means. Automatic air valves of every kind have been invented, but until recent date a reliable and perfect working automatic air valve for hot water heating has been unknown.

The Van Auken Steam Specialty Co., of Chicago, have placed a valve on the market which is claimed to be emphatically what its name implies, automatic, and herewith presents a sketch of same to the readers of this journal. Among the many inquiries received daily by the company were such questions as this: "Will your Duplex automatic air valve work on hot water radiators?" Seeing that there was a demand for a hot water automatic air valve, this company set to work at once designing and perfecting one, and have now placed on the market the Van Auken hot water automatic air valve.

It is claimed for this device that it will keep the radiator free from air at all times, and will positively prevent the escape of water. The principle in connection with the workings of the valve is the same as the piping of a hot



water plant, as by means of a small tube which opens from the radiator into the upper portion of the valve it keeps a constant circulation through it at all times. This allows the hot water to rise to the top and the cold to escape through the lower opening into the radiator; the valve being placed at the highest point on the radiator, of course the air accumulates in it, and as it does so forces the water out of the valve into the radiator; when the valve becomes full of air the float drops and allows the air to escape until the water again enters and closes it, thus acting automatically.

The valve does its work well and reliably, requiring no adjusting or attention whatever. It is made in two parts so that it can be kept close to the radiator. It is guaranteed in every respect as represented for hot water heating purposes, and the originators are determined to make it the standard hot water valve of the day. For further particulars address the Van Auken Steam Specialty Co., Chicago.

TAXATION OF MANUFACTURES.

One result of the present agitation of the question of taxation is the discovery that many of our tax laws operate as direct discouragers of enterprise and industry, and that it is possible, in many places, for a man who invests his capital in such a way as to do nothing or next to nothing toward the development of industries, to almost entirely escape taxation, while he who is employing his capital and his energies in such a way as to do most toward the development of industries which build up communities, is taxed to the maximum, and in effect fined for his industry and enterprise. One would think that in the State of Massachusetts, if anywhere, the importance of manufacturing and building industries would be fully appreciated, and that its tax laws would long ago have been arranged in such a way as to encourage such industries. Yet a commission appointed by the Mayor of Boston, to look into the subject of taxation, has recently made a report, in which the grossest inequalities are shown to exist in the tax laws of that State, and that the burden imposed by these inequalities falls heaviest upon the very persons and enterprises that do most to develop and build up the community.

The commission particularly condemned the system of personal taxation, under which any one who owns anything whatever in which labor has been employed in the making, or for which labor is required for the operation, is heavily taxed, and the amount of the tax made somewhat dependent upon his honesty—the more honesty the more tax; the more dishonesty (in making returns) the less tax. Much of the taxation imposed by the State is shown to be double taxation, *i. e.*, property itself is taxed, and again the evidence of ownership of property is taxed. To illustrate: The buildings, machinery and stock of an incorporated manufacturing company may be taxed, and then each stockholder is taxed on his stock in the company, which is clearly double taxation, and a direct discouragement of manufacturing enterprise and honesty as well; for those who are least scrupulous simply evade one tax or the other by misrepresentation, leaving the more conscientious to bear the additional burden thus imposed. The commission recommends that taxation of personal property be abolished, and all taxes placed upon real estate, which of course, cannot be concealed, nor its value very far misrepresented, and it believes that this value would pretty accurately measure the capital put upon real estate, and that the burden of taxation would therefore fall much more equitably than now, and in a way much less calculated to discourage enterprise and industry.

Whether this be true or not, the proposition is one in which manufacturers must be especially interested. But to show that taxes may be laid upon real estate in such a way as to be unfair and burdensome, we need only relate the experience of a young mechanic of our acquaintance, who, by industry and economy saved enough to buy a building lot and erect a home for himself and family upon it. He paid $650 for his lot, and the land owner, who still owned similar lots on either side of him, was assessed for taxation at $150 per lot, while our young mechanic was assessed on his lot, exclusive of the improvements, at a valuation of $500, and the vacant lot owner continued to pay taxes on a valuation of $150 for precisely similar lots, now holds them at $1,000, the increase in value being caused mainly by the erection of our friend's, and similar houses. Thus that town is seen to be encouraging vacant lots, and discouraging the building of houses; and it works the same way with manufacturing or other enterprises, which build up the wealth of communities and increase the value of land for the benefit of the land speculator, who usually manages to escape paying anything like his fair proportion of taxation.—[American Machinist.

A Novelty in Advertising.

The Westinghouse Machine Co. has started out on a rather unique advertising campaign for this year. It has contracted for ample space with a number of the most prominent class-papers in the country (of which, of course, this publication is one), and during the year, it is the intention to publish 12 different advertisements, which, taken together, will give the reader a fair, though brief, history of the company's operations. Thus, the first card (which appeared in April) was intended to impress the reader with the following facts:

1st. That four types of engines are made.

2d. That the goods are made of hardened steel templates, and are consequently interchangeable.

3d. That both engines and repairs are carried in stock.

4th. That all goods are sold through the medium of resident agents in every part of the civilized world, with the name and address of each.

The space in May is devoted solely to a statement of "A few points which seem to have won public favor."

In June, an attempt will be made to briefly show the difference between Westinghouse and other engines.

Later, illustrations will be given of the four types of engines made, together with the date of birth and the number sold of each up to that date. Following these, an attempt will be made to show the character and intelligence of those who use the engines. It is probable that some few of the more prominent installations or plants may also be described and perhaps illustrated. If anyone will therefore have the courage, the fortitude and the patience to read these 12 cards, it is safe to say that he will at the end of the year have a good general idea of what this company has done and is now trying to do.

Carnegie Direct Contracts.

A New York press telegram on the 29th ult. said that "last week a meeting, attended by the representatives of the firm of J. B. & J M. Cornell and other New York firms, was held to formulate a boycott against the Carnegie people," because the latter contract the sale of structural iron and steel directly with owners or proprietors of projected buildings, instead of taking their orders indirectly through contractors. The programme as outlined by the press advices, seems to embrace a refusal of all the contracts Carnegie, Phipps & Co. may offer for cast iron architectural work—which they do not make at all. These are placed by the company with outside foundries; and the Carnegies now say that they can get as much as they require, "and no such boycott as this will injure" them. The boycott, however, was denied by Mr. H. W. McCord, of Post & McCord. He said that after the meeting a circular letter was sent to all the mills impartially, protesting against trading directly with owners or builders.

Locally, achitectural iron founders only know that there is a strong feeling in their branch of business against the system of contracting which the Carnegie people have adopted.—[Age of Steel, St. Louis.

A Deep Drill Hole.

Some time ago the Wheeling Development Co. began drilling a well near Wheeling, W. Va., in search of petroleum or natural gas. The hole has now reached a depth of 4,100 feet. In this distance several veins of coal have been passed, and both oil and gas have been struck, but not in paying quantities. The hole is eight inches in diameter. It is reported that Prof. White, State Geologist of West Virginia, has succeeded in interesting the officers of the United States Geological Survey in the exploration, and that the hole is to be continued to a depth of 1,000 feet more, or as far as is practicable, with the idea of making investigations of temperature and magnetic conditions.

Mt. Vernon & Pan Handle Route.

Excursions to Cincinnati; one fare for round trip May 18th and 19th, via the Mt. Vernon & Pan Handle Route, for the Nationol Union Conference. Tickets will be good returning until May 22d. For particulars apply to C. L. Kimball, Ass't Gen. Pass. Ag't, 155 St. Clair St., Cleveland, O.

THE Third Congress of the Scoth-Irish Society will be held at Louisville, Ky., May 14-17. One fare for round trip via the Mt. Vernon & Pan Handle Route on May 12th and 13th, good returning until the 19th inst.

PROTECTING YOUR BUILDINGS With an automatic fire sprinkler system makes it absolutely fire proof. All Insurance Companies recognize the "Neracher" as the best made and will make liberal reductions on your present rates if you equip. In this way the system pays for itself inside of two years' time.

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THE NERACHER SPRINKLER CO., - WARREN, O.

BRANCH OFFICES:

Boston, Chicago, St. Louis, Cleveland, Cincinnati, Minneapolis, Pittsburgh.

INDUSTRIAL SUMMARY.

New Enterprises:—

Articles of incorporation have been applied for by the Montreal (P. Q.) Metal Co., capitalized at $50,000.

William Yelland will erect a machine shop in Philadelphia, 24x40 feet, on the east side of Tacony St., north of Orthodox St.

Sewall & Simpson have bought the Palmer Foundry at Kenduskeag, Me., and will make stoves, agricultural implements, etc.

It is reported that a factory is to be erected at Frederick, Md., by Walling, Tyson and Zimmerman, for the purpose of manufacturing the Zimmer window-shutter fastener.

The American Steel Wheel Co. has been incorporated at Trenton, N. J., with a paid-up capital of $600,000, for the manufacture of car wheels and railroad castings, probably in Jersey City.

T. C. Botsford and J. N. Hurt have selected three acres of ground in Akron, O., on which to build their proposed steam car heating works. The buildings will be 80x300 feet and another 60x200 feet.

A movement is on foot at Nashua, N. H., to establish a co operative edge-tool factory by certain employees of the American Edge-Tool Co., who are to remove to Douglas, Mass. It is proposed to raise a capital of $25,000.

H. D. Emerson, T. J. Creaghead, C. L. McCrea and others have incorporated, at Covington, Ky., the Creaghead Engineering Co., to manufacture all kinds of electric, mechanical and manufacturing appliances. The capital stock is $25,000.

The stock company incorporated by J. T. Kelly, T. N. Campbell, J. L. Godfrey and others, for the purpose of enlarging and operating the iron foundry of Kelly Brothers, at Jonesboro, N. C., will henceforth be known as the Jonesboro Iron Works Co.

A charter has been applied for by Bailey, Farrell & Co., of Pittsburgh, Pa., for an incorporation to be known as the Bailey-Farrell Manufacturing Co. The gentlemen interested in this concern are Messrs. A. J. Bailey, J. Farrell, G. H. Bailey, C. J. Noble and J. A. Kelley. They will continue to make all kinds of brass goods, lead pipes, etc.

The Western Grain Transportation Line, of Chicago, has been incorporated. The company intends to manufacture and otherwise acquire, own and operate and sell cars, implements and appliances for the transportation and handling of all freight and merchandise; capital stock, $50,000; incorporators, Frank L. Joy, Arthur S. Kirk and Charles S. Holt.

A new enterprise has been started in Albany under the name of the Electric Gas Machine Co. The company manufacture a new gas machine, for use in supplying gas for suburban houses or detached residences. The officers of the company are Fred F. Wheeler, president; Louis W. Prath, vice-president; Gaylord Logan, secretary and treasurer, and J. W. Tallmadge, manager.

Additions, Enlargements, Removals, etc.:—

A new shop, 115x116 feet, two stories, is to be erected by the Whitin Machine Co., Whitinsville, Mass.

The Whittier Machine Co., of Boston, Mass., are preparing to erect a new shop which will be 166x74 feet.

The Industrial Iron Works at Bay City, Mich., are preparing to build an addition 255x90 feet to their works.

An electric light plant is to be put in the foundry and machine shops of the Ragsdale Manufacturing Co., at Greenwood, Miss.

The Falcon Iron & Nail Co., of Niles, O., are putting up a new building, 150x175 feet, in which they propose to manufacture galvanized sheet iron.

The Globe Iron, Roofing & Corrugating Co., Cincinnati, O., is reported as having purchased and as to put in operation the Swift's Iron & Steel Works, at Newport.

E. H. Bramhall, of Bath, Me., is building a foundry, machine shop and woodworking shop, to be used in connection with his business of building steam yachts.

The capacity of the Bluefield Iron Works, at Bluefield, W. Va., it is reported, is to be increased. These works are owned and operated by W. A. Cather & Bro.

The Apollo Iron & Steel Co., whose works are at Apollo, Pa., are erecting a new building, equipped with the most modern machinery for the manufacture of black sheet iron, which may also be made to include a tinning plant for making tinned and terne plates.

The Enterprise Manufacturing Co., of Philadelphia, Pa., have broken ground for a one-story foundry, 58x104 feet, on the east side of Bodine street, south of Dauphin.

It is stated that P. Maguair and G. S. Moore have received a proposition from a Pittsburgh (Pa.) company for the removal of a 70-ton iron furnace to West Pineville, Ky.

R. M. Clough, manufacturer of the Clough patent cutter for the teeth of gear wheels, has moved his business from Meriden, Conn., to Tolland, Conn., in order to obtain better facilities.

Parties having purchased a controling interest in the Florence Stove & Manufacturing Co., of Florence, Ala., will improve the plant, and put in machinery for the manufacture of plows.

The Beadle & Kelley Co., of Troy, O., manufacturers of agricultural implements, has sold its business to the Common Sense Engine Co., of Springfield, and the plant will be removed to the latter place.

At Colorado Springs, Col., the Rapid Transit Co. are about to add to their plant, and will build, in connection therewith, a machine shop, and equip it with new and improved tools, among which are lathes, drill, wheel, press, etc.

The Case Engine Co., of New Britain, Conn., are building an addition 35x50 feet to their shops, which will soon be equipped and ready for occupancy. Pratt & Cady, of Hartford, Conn., have erected a new brick foundry 75x240 feet, with monitor roof, and having a capacity of over 40 tons per day. It is wholly of iron, and a pattern room, casting room and storage sheds have also been built, of nearly equal size.

The Cleveland Twist Drill Co. have just let a contract for an extension to their building, and by June 1st they will have increased their facilities by an addition of 115x40 ft., three stories high, which they propose to fill with machinery as rapidly as it can be gotten out. They are forced to this large extension of their plant by the rapidly growing demand for their drills, which are, and always have been, first-class.

The Spang Steel & Iron Co., at Etna, Pa., have just completed the specifications for a new department to be devoted to all kinds of heavy Government work. The new structure will occupy about two acres of ground, and work on the foundations for six open-hearth Bessemer melting furnaces and three heating furnaces will soon commence. The cost is estimated at $250,000, and when completed the entire works will occupy over twelve acres of ground.

General Industrial Notes:—

The machinery establishment of Davis & Cresswell, at Denver, Col., the largest of its kind in the West, has been totally destroyed by fire. The loss on building and contents is $125,000.

The firm of Alex. Laughlin & Co., engineers and contractors, of Pittsburgh, who have heretofore been occupying temporary offices in the Lewis Block, in that city, have located permanently in room No. 514 in that building.

The new foundry of the Atherton Machine Co., at Lowell, Mass., is nearly completed, and it is said that it will be one of the best arranged in New England. There will be an overhead system of cranes to carry the melted iron to each molder.

Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 20th day of May, 1891, for all the labor and materials and fixing in place, complete, the low-pressure, return-circulation steam heating apparatus, required for the U. S. Custom House building, at Bristol, R. I.

Among the firms in the galvanized iron cornice and roofing business, in Detroit, is the well-known firm of W. J. Burton & Co. They manufacture under patent, the celebrated Eastlake metal shingles for roofing and siding. These shingles are stamped slate pattern exposed 1¼"x6" to the weather, on tin, galvanized iron or steel sheets, 20"x28" in size. Their fastenings and locks are constructed to avoid the least possibility of leakage, costing less to make and much less to lay than any other roofing made. They are superior to wood shingles because they are fire-proof, and will not warp, split or rot, but will endure as long as the building lasts, and yet cost only about as much as pine shingles. Messrs. Burton & Co. have roofed and furnished Eastlake shingles, and corniced and skylighted many buildings (public and private) in Michigan, Indiana, Ohio, Illinois, Missouri, North and South Carolina, and, in fact, their books show customers in nearly every State and Territory in the

Union, giving utmost satisfaction to their patrons and architects. Their excellent facilities enable them to carry out any special design wanted. Architects, builders and property owners will find W. J. Burton & Co. capable and agreeable gentlemen who will carry out orders entrusted to them in a satisfactory manner, and when in need of anything in the roofing or architectural iron line, we cheerfully recommend you to correspond with them.

The Condensation of Steam in Pipes.

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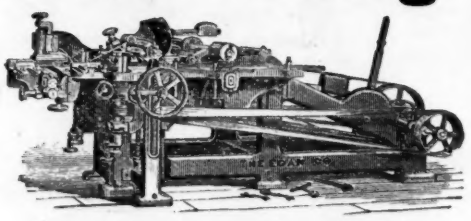

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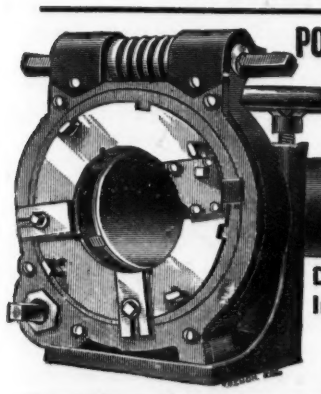

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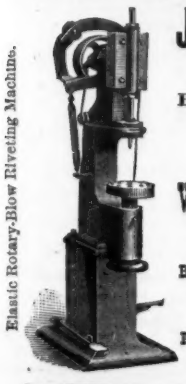

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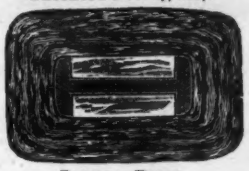

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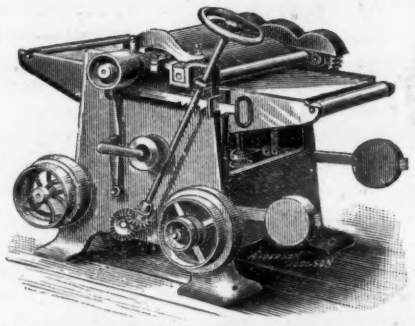

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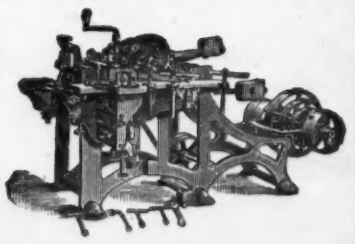

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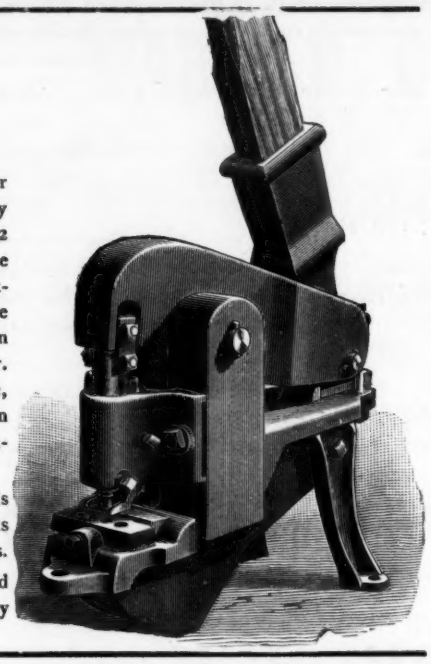

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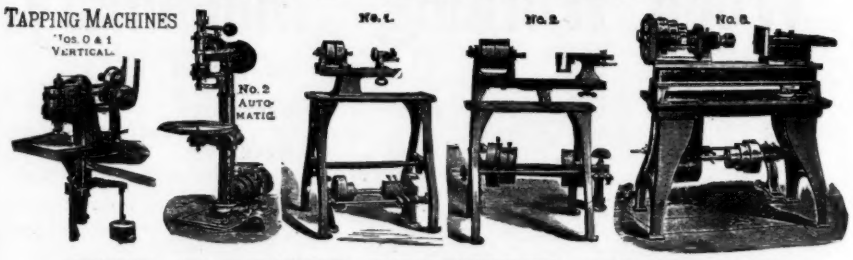

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2¾ to 3¼ inch	2 10
3¼ to 4 inch	2 80
4¼ to 4½ inch	3 30
4¾ to 5 inch	3 50

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⅜ to 1¼ inch	2 30
⅜ to ½ inch	2 40
⅝	2 60
⅝	3 00

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1¾ to 3 inch	2 90
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⅜ to ½ inch	3 10
⅝	3 30
⅞	4 80

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¼ to 6 by ¼ and 5-16 inch	2 00
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¼ to ⅜ by ¼ and 5-16 inch	2 30
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1 to 1¾ by Nos. 11 and 12	2 50
⅞ and 13-16 by ⅛ to 3-16 in	2 70
⅞ and 1 3-16 by Nos. 11 and 12	2 80
¾ and 11-16 by ⅛ to 3-16 in	3 00
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⅝ and 9-16 by ⅛ to 3-16 in.	3 30
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Rooms 716, 717, 718, 719 Perry-Payne Bld'g.

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OGLEBAY, NORTON & CO.,

Successors to Tuttle, Oglebay & Co.,

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FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS,

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Exclusive attention given to

LAKE SUPERIOR AND MENOMINEE RANGE

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Pig and Bar Iron,

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MINERS AND SHIPPERS OF

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JAS. PATTERSON, Sales Agent.

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ATTENTION OF FOUNDRY MEN is called to Shawk's Superfine Moulding Sand, for malleable, hollow ware, stove and brass castings. It has no superior for lasting, strength and vent qualities. Send for price.

L. S. Fish, Sole Agent,

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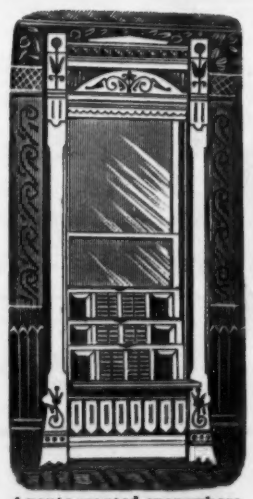

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HARTMAN & DURSTINE, No. 59 Beaver St. Wooster, O.

MACHINERY SUPPLY MARKET.

Anvils.

American.....₩ lb 9@10
Wrights.....₩ lb 12

Bellows.

Blacksmiths' { Hill's.....dis 40 / Bullock's.... dis 50&10
Moulders'.....dis 40@40&10
Hand.....dis 40&10@50

Belting.

Boston Belting Co's standard.....dis 70
" " " extra.....dis 60&5
" " " best.....dis 55
Hoyt's Short Lap.....dis 45
Cleveland Rubber Co. extra standard..dis 60&10
Shults Raw Hide Leather Belting, single.....dis 40
Shults Raw Hide Leather Belting, double, and Light Double.....dis 40
Standard, oak tanned.....dis 50&10
Alexander Brothers' pure oak tanned. ...dis 45

Blowers and Exhausters.

B. F. Sturtevant's.....dis 20
Boston Blower Co.....dis 35
Buffalo.....dis 35

Borax.

.....₩ lb 12

Chalk.

White.....₩ gross 50
White Crayon.....₩ gross 12@12½ dis 10
Red.....dis 70
Blue.....dis 85

Chucks.

Cushman's 4 Jaw Independent.....dis 45
" Combination.....dis 40
" Geared Scroll.....dis 30
" 2 Jaw Brass Workers.....dis 30
" Drill.....dis 35
Wescott's Scroll Combination.....dis 33⅓
" Independent.....dis 40
" Little Giant Drill.....dis 30
Horton's Universal.....dis 40
" Independent.....dis 45
Whiton's Independent.....dis 45
National Combination.....dis 40
Sweetland " .....dis 40
Almond Drill.....dis 20
Morse " .....dis 15
Skinner's Combination Lathe.....dis 33⅓
" Independent Lathe.....dis 40
" Universal Lathe.....dis 40
" Drill.....dis 15

Cutters and Reamers.

Cleveland.....dis 10@15
Pratt & Whitney.....dis 10@15
Standard.....dis 10@15
Brown & Sharpe, Milling Cutters.....dis 15
" Gear Cutters.....dis 15

Crowbars.

Cast Steel.....₩ lb 4
Iron, steel points.....₩ lb 3¼

Drill and Drill Sockets.

Twist drills.....dis 50&10
Morse Taper and Straight shank to 1⅜".....dis 50&10
Morse Taper and Straight shank Larger than 1⅜".....dis 25
Drill Sockets.....dis 25
Standard Twist Drills.....dis 55@55&5
Cleveland " .....dis 55@55&5

Emery.

	No. 4 to 46 gr.	No. 54 to 150. gr.	Flour, F.	C. F. FF.
Kegs, ₩ lb	4 c	5 c		2½c
¼ kegs ₩ lb	4¼c	5¼c		2¾c
½ kegs ₩ lb	4½c	5½c		3 c
10 lb cans, 10 in case	6 c	6½c		5 c
10 lb cans, less than 10	10 c	10 c		7½c

Emery Cloth and Paper.

Barder, Adamson & Co.....dis 45@50
H. H. Barton.....dis 50@50&10

Emery Wheels.

Detroit.....dis 55@60
Norton's.....dis 55@60
Grant.....dis 55@60
Sterling.....dis 60
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60
Vulcanite.....dis 10&10

Files.

Nicholson.....dis 60&10@60&10&10
" "X. F".....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
Arcade.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
ndustry File Works, hand cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs. 18c over 5 lbs 14c, new list.

Jack Screws.

Illinois Bolt Co. list.....dis 70

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4½	4	3¼	2¾
Hexagon	15½	11½	8½	6	5¼	5¼	5
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1lb boxes add 1c to list.

Nails (wire.

List July 14, 1887.....dis 70 &10
Standard Penny Nails, ₩ keg card rate { Car lots.....$2.30 / Less than car lots $2.40

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz.....dis 10@10&10

Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....₩ lb 10@11
Russia Packing " .....₩ lb 14
Italian Packing " .....₩ lb 13@14
Plumbago Piston.....₩ lb 40
Morrison's " .....₩ lb 50
Square Flax " .....₩ lb 50
Sheet Rubber.....₩ lb 12&24
Excelsior Rubber.....₩ lb 40

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 45
Medart Pulleys.....dis 55
Split Wood Pulleys.....dis 50@55

Rivets.

Iron, Thousand, list November 17, ...dis 50
Iron, Ordinary, Cooper's Block and Carriage list November 17.....dis 50
Copper.....dis 50@50&10

Rope.

Manilla, ¼ inch and over.....₩ lb 15¼
Sisal, ¼ inch and over.....₩ lb 13¼

Sand Paper.

B. A. & Co.....dis 45@50
H. H. Barton's.....dis 40@45
New England Flint.....dis 40@50
Barton's Garnet.....dis 20

Saws.

Disston's Circular.....dis 40@
" "Band.....dis 1
" Scroll.....
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Disston's.....dis 3
Atkins' Cicular Saws.....dis 40&45
" Mill, Mulay and Drag Saws..dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....dis 70c per ft
" Dexter Cross-cuts.....dis 50c "
" Diamond " .....dis 30c "
" Tuttle Tooth Cross-cuts..dis 25c "
" One-man Cross-cuts.....dis 23c "
No. 1 Handles.....dis 23c per pair
No. 6 " .....dis 16c "
Excelsior Saw Tools.....$6 per doz
Perfection " .....$15 "
Detroit Saw Works, Circular.....dis 50
" " " Band.....dis 25
" " " Mulay.....dis 45

Screws.

Wood Screws—New List 1850.

Flat head iron.....dis 72½
Round head iron.....dis 60 ½
Flat head brass.....dis 72½
Round head brass.....dis 60
Square Cap.....dis 65
Hexagon Cap.....dis 60
Set C. H. C. P.....dis 70
Machine, flat head, iron.....dis 65
Machine, round head, iron.....dis 60
Bench and hand—
Lag or coach.....dis 75@75&10
Coach, patent gimlet point.....dis 75

Shovels and Spades.

Ames' list November 1, 1885.....dis 20
Dennis.....dis 5.25
Hussey & Binns, railroad.....dis 8.00

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 50
Pulley Taps.....dis 40

Twine.

	BC.	B.
No. 12, Flax Twine, ¼ and ⅛ lb Balls		21c@29c
No. 18 " " ¼ and ⅛ "		18c@28c
No. 36 " " ¼ and ⅛ "		16c@27c
2-Ply Hemp, ¼ & ⅛ lb Balls (Spring Twine)		11½c
3-Ply " 1lb Balls		12@12½c
3-Ply " 1½ lb Balls		11@11½c
Cotton Wrapping, 5 Balls to lb		15@16c

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 25

Wire.

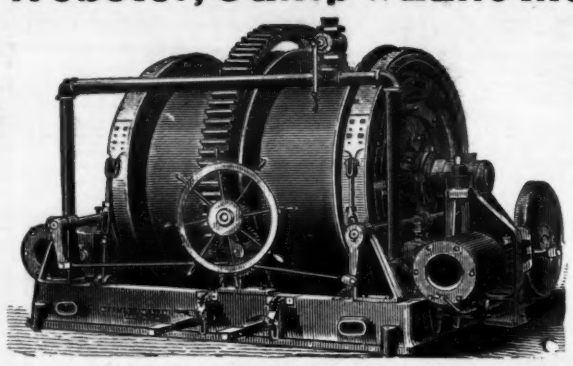
New List, Jan. 18, 1884

Brass and copper.....dis 20@25
Bright and annealed, Nos. 0@18...dis 70&10@75
" " Nos. 19@26..dis 75@75& 5
" " Nos. 27@36..dis 75&10& 5
Coppered Nos. 0 to 18, market list..dis 70@70& 5
Galvanized Nos. 0 to 18 " " .....dis 65&5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....$6.00@lb dis 3

Wrenches.

Coe's genuine, ...dis 50
Girard Standard.....dis 70&10
Agricultural.....dis 75&10
Mechanics'.....dis 55&10,& 5
Bemis & Call's Combination .....dis 35
Donohue's Engineers.....dis 20&10
Lamson & Sessions Engineers.....dis 60
Billings & Spencer's Drop Forged.....dis 25
William's " " .....dis 25
Alligator " " .....dis 50

Webster, Camp & Lane Machine Co.



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Improved Band Friction Hoisting Machinery, Geared or Direct Acting, for round or flat rope.

Wire Rope Haulage Machinery,

Endless or Tail Rope Systems.)

CORNISH PLUNGER AND BUCKET LIFT PUMPS.

Automatic or Slide Valve Steam Engines, Sheaves, Cages, Buckets, Etc.

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Old st and Largest Manufacturers in the world.

VULCANIZED RUBBER GOODS

For Mechanical purposes.

256-260 DEVONSHIRE STREET, BOSTON.

100 Chambers St., New York.
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148 to 150 Water st, Cleveland, Ohio
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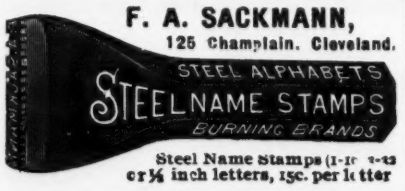
CLEVELAND, O.

LIGHT AND HEAVY

IRON CASTINGS.

DAILY MELTING CAPACITY 75 TONS—SPECIAL FACILITIES FOR ECONOMICALY TURNING OUT SMOOTH CLEAN CASTINGS.

DUPLICATE WORK A SPECIALTY



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125 Champlain. Cleveland.

Steel Name Stamps (1-16 to 1 or ½ inch letters, 15c. per letter

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Detachable Roller and Chain Belting,

CHAIN.

MADE IN ALL SIZES OF

Malleable Iron and Steel,

DESIGNED FOR

Elevators, Conveyors, Drive Belts, etc.

For handling materials of all kinds.

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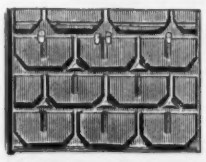
Eastlake Metallic Shingles.

Unequaled for ROOFING AND SIDING.



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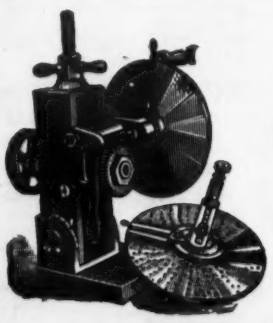

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CAN BE USED ON ANY SCREW-CUTTING LATHE FOR

Amateurs, Clock Makers, Model Makers, Knitting Machine Makers, Tool Makers,

Or any one having use for SMALL GEARING.

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HEAVY AND LIGHT CASTINGS.

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THE BRIGHTMAN STOKER IS THE BEST
STEAM BOILER FURNACE IN THE WORLD.
SEND FOR DESCRIPTIVE PAMPHLET. THE BRIGHTMAN STOKER CO. 201-203 RIVER ST. CLEVELAND, OHIO.

HARDWARE MARKET.

Augers and Bits.

Common augers and bits.....dis 70
Snell's.....dis 60&5
Cook's Douglass Mfg. Co.....dis 55
Russell Jennings' augers and bits.....dis 25
Expansive Bits, Clark's small, $18; large, $26.....dis 35@35&5
Hollow Augers, Ives'.....dis 25&10
Hollow Augers, Bonney's Adjust. ℔ doz., $48.....dis 40&10
Hollow Augers, Stearns' Adjust. ℔ doz., $48.....dis 20&10
Gimlet bits, common.....per gross $3 25@4 00
Standard Bit Stock Drills.....dis 50&10&5
Ship Augers.....dis 15&10@15&10&5

Axes.

Makers' and Special Brands—
First quality.....℔ doz $8 00
Others.....℔ doz $7 00
Full polished.....℔ doz $9 00

Bolts.

Cast iron barrel bolts.....dis 70
Cast iron shutter bolts, etc.....dis 70
Cast iron chain bolts.....dis 65&10
Ives' patent door bolt.....dis 60
Wrought iron barrel bolts.....dis 70
Wrought iron square bolts.....dis 70
Wrought shutter bolts.....dis 60&10
Sargent's list
Carriage, common, new list.....dis 75&10
Tire, common, new list.....dis 65
Carriage and tire, Philadelphia pattern.....dis 75&10
Stove bolts.....dis 60
Plow bolts.....dis 60&5
Machine.....dis 75&10@80
Ends.....dis 75&10&80

Buckets, Elevator.

.....dis 50&10

Butts.

Wrought brass.....dis 75&10
Cast brass, loose joint.....dis 33⅓
Cast Iron—
Fast joint, narrow.....dis 50&10&5@60
Fast joint, broad.....dis 50&10@60
Loose joint.....dis 70&10
Loose joint, jap.....dis 70&10
Loose joint, jap. with acorns.....dis 70&10
Loose pin, acorns.....dis 70&10
Loose pin, japanned acorns.....dis 70&10
Loose pin, acorns, jap. plated tips.....dis 70&10
Wrought steel—
Wrought, fast joint, narrow.....dis 70&10
Wrought, fast joint, broad.....dis 70&10
Wrought, loose joint, broad.....dis 70&10
Table Butts, back flaps, etc.....dis 70&10
Regular inside blind.....dis 70&10
Light inside blind.....dis 70&10
Loose pin.....dis 70&10
Light loose pin.....dis 70&10

Carbonized Felt and Building Papers.

(POWERVILLE BRAND.)

	Per roll of 500 sq. feet.
Eberts Bros., Detroit.	
No. 1—Slaters'	$1.25
"A," Stringed Roofing, Light	1.50
"B," Stringed Roofing, Medium	1.75
"C," Stringed Roofing, Heavy	2.00
Stringed, Rosin-Sized	1.00

MILCELLANEOUS.

Asphaltum, Trinidad Refined, ℔ ton	$30.00
Asphaltum, Fine Grade, ℔ lb	.08
Coal Tar Felt, 1 Ply, ℔ lb	.02
Coal Tar Felt, 2 Ply, ℔ roll 108 sq ft	1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq ft	1.85
Roofing Pitch, ℔ gal	.09

Chains.

Revised List.
Trace, 6¼-10-2.....℔ pair 1.03
Trace, 6¼-10-3.....℔ pair .92 } .....50&10
Trace, 7-10-2.....℔ pair 1.11
German Halter Chain, list June, 1887...dis 50&10
German Coil, list of June, 1887.....dis 50&10@60
Galvanized Pump Chain.....℔ D5¼@6
Jack Chain, Iron.....dis 75&10
Jack Chain, Brass.....dis 75

Chisels.

Socket Framing and Firmer.....dis 75
Socket Framing and Firmer, Buck Bros..dis 30
Socket Firmer and Framing, L. & I. J. White.....dis 30@30&5
Tanged Firmers.....dis 40&10

Cutlery.

Table.....net
Excelsior Pocket.....net

Fibre Ware—Standard.

	Nos. 1	5.	5X.
Pails, water, 12 qt	$4 00	$4 50	$.....
Dairy, 14 qt	4 50	5 00	.....
Fire 12 qt	5 00	....	.....
Sugar	6 00	6 50	.....
Horse	.....	5 00	.....
Buggy	4 00	.....	.....
Chamber, Slop, Commode } 5 and 5X 14 qt.	6 50	7 50	8 50
Chamber slop. 5 and 5X 14 qt	8 00	9 00	10 00
Basins, wash—			
10½ inch	2 00	2 25	.....
12 inch	2 25	2 75	3 25
13½ inch	2 75	3 25	3 75
15 inch	3 25	3 75	4 25
Bowls, fruit	.....	2 50	.....
Servers, 12 in	.....	2 25	.....
Baskets, waste paper, 13 in	.....	6 00	.....
Spittons, "Daisy," pressed			
8 inch	4 00	4 50	5 00
10 and 11¾ inch	6 00	6 50	7 50

No. 1 plain; No. 5 decorated; No. 5X White decorated.

Gimlets.

Nail and Spike.....dis 50&10&5
Double cut, low list.....dis 25
"Bee".....℔ gross $12, dis 25@25&5

Hanger

Barn door, old patterns.....dis 60&10&10@70
Climax, (Anti-Friction).....dis 60
Scranton.....dis 33—
Kidder's.....dis 50&10@60
Terry's Patent.....5 in., $12; 4 in., $10, dis 50&5
Paragon.....dis 40&10
Richard's.....dis 30@30&10

Horse Nails.

No.	10	9	8	7	6	
Ausable, ℔ lb.	23	24	25	26	28	dis 40
Putnam, ℔ lb.	18	19	20	21	23	dis 15
Essex						dis 25&10

Horse Shoes.

Burden, at factory.....℔ keg $4 00
R. I. Horshoe Co., Perkins' Imp. at factory.....℔ keg $4 00
Mule Shoes, at factory.....℔ keg $5 00

Knobs.

Carriage, japanned.....℔ gross 80c dis 60&10
Base, rubber tip.....dis 70&10&5
Hematite door knobs, new list.....dis 40&10@50
Door mineral.....dis 65c@68c
Door Por. japanned.....dis 75c@78c
Door Por. nickle.....$2 00@2 25
Door Por. plated.....$2 00@2 25

Locks, Bolts, Etc.

P. & F. Corbin, Locks and Bronze Goods.
Door locks, knobs and latches.....dis 60&10
Escutcheons and keys.....dis 60&10
Padlocks and padlock keys.....dis 75
Bell pulls, mineral, porcelain and jet dis 60&10
Bell pulls, genuine bronze.....dis 60&10
Lever bell pulls, genuine bronze.....dis 60&10
Butts', genuine bronze.....dis 60&10
Butts' bronze plated.....dis 60&10
Store door locks and latches.....dis 60&10
Store door handles.....dis 60&10
Shutter hinges&flaps, genuine bronze.dis 60&10
Shutter hinges, bronze plated.....dis 70
Flush bolts, genuine bronze.....dis 70
Shutter knobs, genuine bronze.....dis 50
Shutter bars, genuine bronze.....dis 60
Sash lifts, genuine bronze.....dis 60
Sash pulls and plates, genuine bronze.....dis 60
Push plates, genuine bronze.....dis 60
Drawer pull, genuine bronze.....dis 70
Letter box plates, genuine bronze.....dis 60&10
Barn door locks.....dis 33⅓
Bishop's Buckeye Sash Locks.....℔ gross $4.80

Plumbs and Leve s.

Standard list.....dis 70&10
Pocket levels.....dis 70&10
Davis' inclinometers.....dis 10&10

Pumps.

Cistern, best makers.....dis 50&10@60
Pitcher spout, best makers dis 60&10@60&10&10
Pitcher spout, cheaper goods.....dis 70@70&5

Pokes, Animal.

Bishop's I. X. L.....℔ doz $6 00
Bishop's O K.....℔ doz $5 25
Bishop's Pioneer.....℔ doz $3 75
Bishop's American.....℔ doz $2 75

Rakes.

Cast steel.....dis 70
Malleable.....dis 70@70&5

Razors.

J. R. Torrey Razor Co.....dis 20
Wostenholme & Butcher.....$10@$4.....dis 10
Rifle razor.....dis $9 50 net

Rat Killers.

Schuyler's.....℔ gross $15 00

Scales.

Hatch, Counter, No. 171.....℔ doz $21 00
Hatch, Tea, No. 161.....℔ doz $6 75@7 00
Chatillon's Grocers.....dis 50
Family Turnbulls.....dis 30@30&10
Scale Beams, List of January 12, 1882.....dis 50&10@50&10&4

Screw Drivers.

Stanley R. & L. Co.'s Varnished Handles.....dis 65&10
Stanley R. & L. Co.'s Black Handles..dis 60&10
Sets interchangeables.....℔ doz $18 dis 25

Squares.

Steel and iron, Nickel plated } dis 75&10@80
Disston's try square and T bevels.....dis 45&10
Winterbottom's try and miter.....dis 30&10

Tacks, Brads, Etc.

New List, Oct. 19, 1890.

American iron carpet tacks all kinds dis 77½&10
Steel carpet tacks all kinds.....dis 75&10
Swedes iron carpet tacks, all kinds dis 75&10
Swedes iron tacks.....dis 75&10
Swedes iron Upholsterers' tacks.....dis 75&10
Tinned Swedes iron tacks.....dis 77½&10
Tinned Swedes iron Upholsterers' tacks.....dis 77½&10
American iron cut tacks.....dis 77½&10
Copper tacks.....dis 4 &10
Copper finishing and trunk nails.....dis 50&10
Cigar box nails.....dis 50&10
Finishing nails.....dis 60&10
Hungarian nails and miners' tacks...dis 60&10
Gimp and lace tacks.....dis 77½&10
" " " tinned.....dis 60&10
Trunk and clout nails.....dis 72½&10
Tinned trunk&clout nails.....dis 66&10
Basket nails.....dis 66&10
Chair nails.....dis 66&10
Common and patent brads.....dis 66&10

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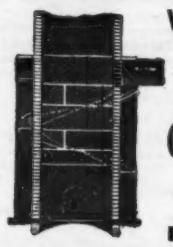

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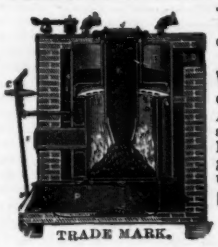
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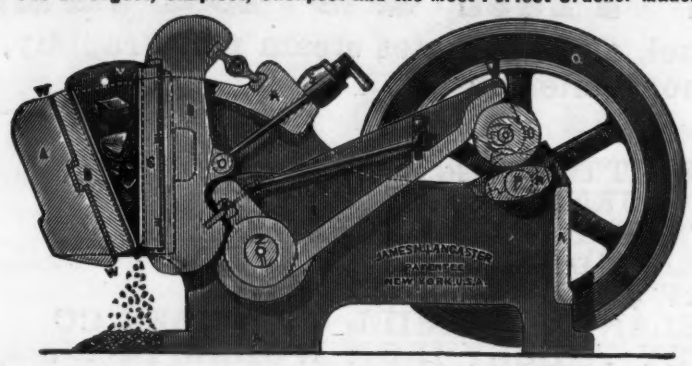

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Standard Time.

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	Arrive.	Depart.
N. Y. & Pitts. Express.....	‡5 38 a m	*8 25 a m
Fast N. Y. & Pitts. Express*	10 55 a m	*3 00 p m
Mahoning Accommo.....		†6 40 a m
Pittsburgh Express.....	†6 25 p m	
Youngstown Local.....	†8 05 a m	
Mahon'g div. & Pitts Local		*11 40 a m
Mahoning Val. Accom.....		†4 30 p m
Pittsburgh Express.....	‡1 20 p m	11 10 p m
New York Express.....	*8 00 p m	.....

*Daily. †Daily, except Sunday. ‡Daily except Monday.

Cleveland & Canton Railroad.
(Standard Gauge.)

Depart for—
Zanesville and Coshocton—6:50 a. m., 3:00 p. m.
Canton—6:50 a. m., 3:00 p. m., 6:20 p. m.
Kent—6:50 a. m., 3:00 p. m., *5:45 p. m. 6:20 p. m.
Bedford—6:50 a. m., 11:10 a. m., 1:30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m. 10:35 p. m.
Newburgh—6:15 a. m., 6:50 a. m., 11:10 a. m., 1.30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m., 10:35 p. m.

Arrive from—
Zanesville and Coshocton—10:30 a. m., 6:30 p m.
Canton, 10:30 a. m., 2:35 p. m., 6:30 p. m.
Kent—*8:10 a. m., 10:30 a. m., 2:35 p. m., 6:30 p.m.
Bedford—6:00 a. m., *8:10 a.m., 10:30 a.m., 1:05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p.m., 7:10 p.m.
Newburgh—6:00 a. m., 7:15 a. m., *8:10 a. m., 10:30 a. m., 1.05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p. m., 7:10 p. m.
Trains marked * run daily.

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FOR AKRON, CANTON AND MARIETTA.
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	Depart.	Arrive.
Valley Junction Mail.....	*7 25 a m	*6 40 p m
Marietta Express.....	†11 15 a m	†2 35 p m
Balto. & Wash. Express....	*4 00 p m	*10 25 a m
Cleve. and Canton Express	†6 30 p m	†8 15 a m

*Daily. †Daily, except Sunday.

J. T. JOHNSON, Gen. Supt. J. B. CAVEN, Gen. Pass. Agt.

From Cleveland Union Station.

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Cleveland & Pittsburgh R. R.

	Depart.	Arrive.
For Pittsburgh, Baltimore, Washington, Philadelphia and New York.	7 45 a m	d5 25 a m
	1 15 p m	12 50 p m
	d11 10 p m	6 35 p m
Wheeling and Bellaire.	7 45 a m	12 50 p m
	1 15 p m	6 35 p m
	*11 10 p m	.....
Alliance Accom.....	3 25 p m	10 10 a m
Ravenna Accom.....	5 00 p m	8 25 a m

d Daily. * Except Saturday. Other trains except Sunday.

From Cleveland Union Station.

Mt Vernon and Pan Handle Route

Cleveland & Pittsburgh R. R.

	Depart.	Arrive.
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon, Columbus, Xenia, Dayton, Cincinnati, Louisville, Indianapolis, St. Louis, and all points in the South and Southwest.	8 00 a m	d 7 00 am
	d 8 00 p m	5 40 p m
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon and Columbus.	1 15 p m	12 50 p m
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	3 25 p m	10 10 a m

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No. 72, New York & Pitts. Express....	* 8 10 a m
No. 70, Pittsburgh Accom.....	*11 35 a m
No. 64, New York & Pitts. Limited...	* 2 50 p m
No. 66, Mantua Accommo.....	* 4 20 p m
No. 74, Youngst'n Ex.....	† 6 00 p m
No. 68, New York & Pitts. Ex.....	*11 00 p m
	Arrive.
No. 61, N. Y. & Pittsburgh Express...	† 5 15 a m
No. 71, Youngstown Accom.....	* 7 15 a m
No. 65, New York & Pitts. Lim.....	* 9 55 a m
No. 67, Pittsburgh Accom.....	*12 45 p m
No. 73, Leavittsburgh Local.....	* 2 10 p m
No. 63, New York & Pitts. Ex.....	* 6 50 p m
No. 75, Mantua Accom.....	* 7 20 p m
No. 69, Youngstown Express.....	† 9 10 p m

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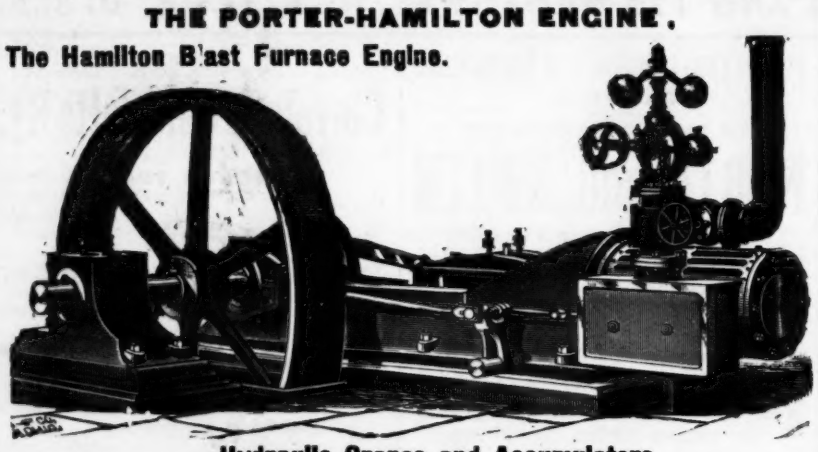

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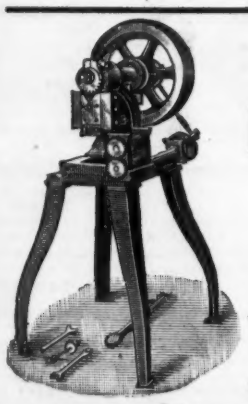

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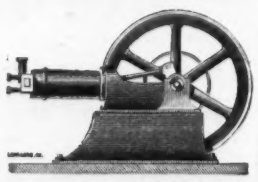

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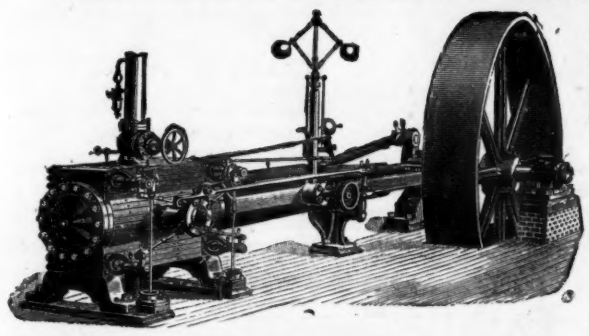

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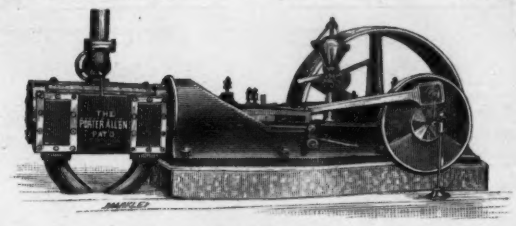

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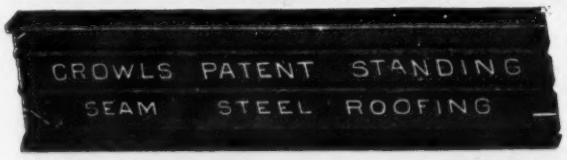

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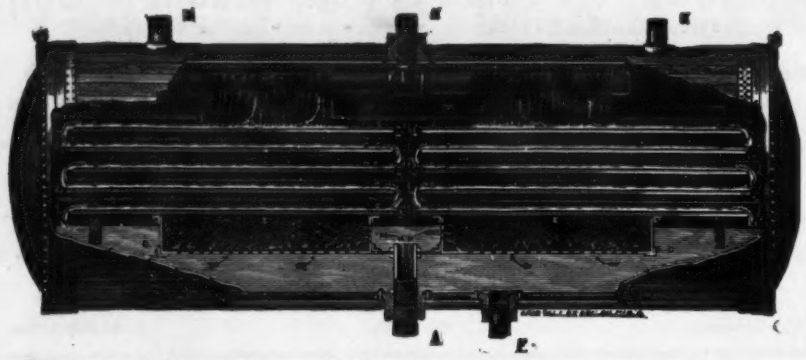

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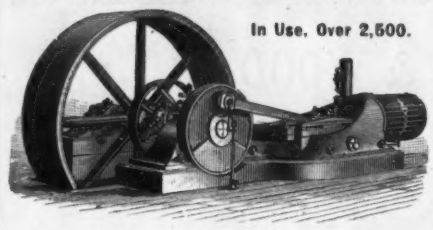

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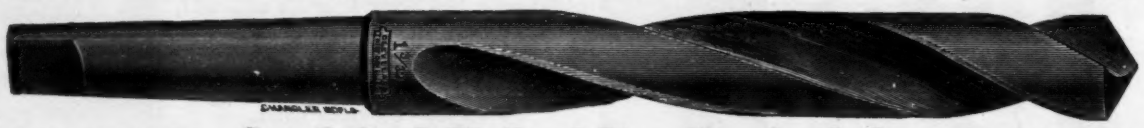

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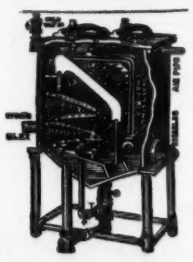

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